AVIATION WEEK
APR. 28, 1952
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Greater Safety for Sub-Killers!

Installing Goodyear bullet-sealing tank in wing of P2V-5, shown in flight in smaller picture

PRIME anti-submarine patrol plane of the U.S. Navy is the Lockheed P2V-5 "Neptune"—one of a long series of naval aircraft to rely on Goodyear bullet-sealing fuel tanks for added protection.

Tanks in the "Neptune" are lineal descendants of the first practical self-sealing airplane tank—Goodyear-developed at the end of World War I—and the improved tank that was standard for World War II aircraft. It features a lining of synthetic rubber and cord in a completely nonmetal tank—effectively seals itself when punctured by gunfire.

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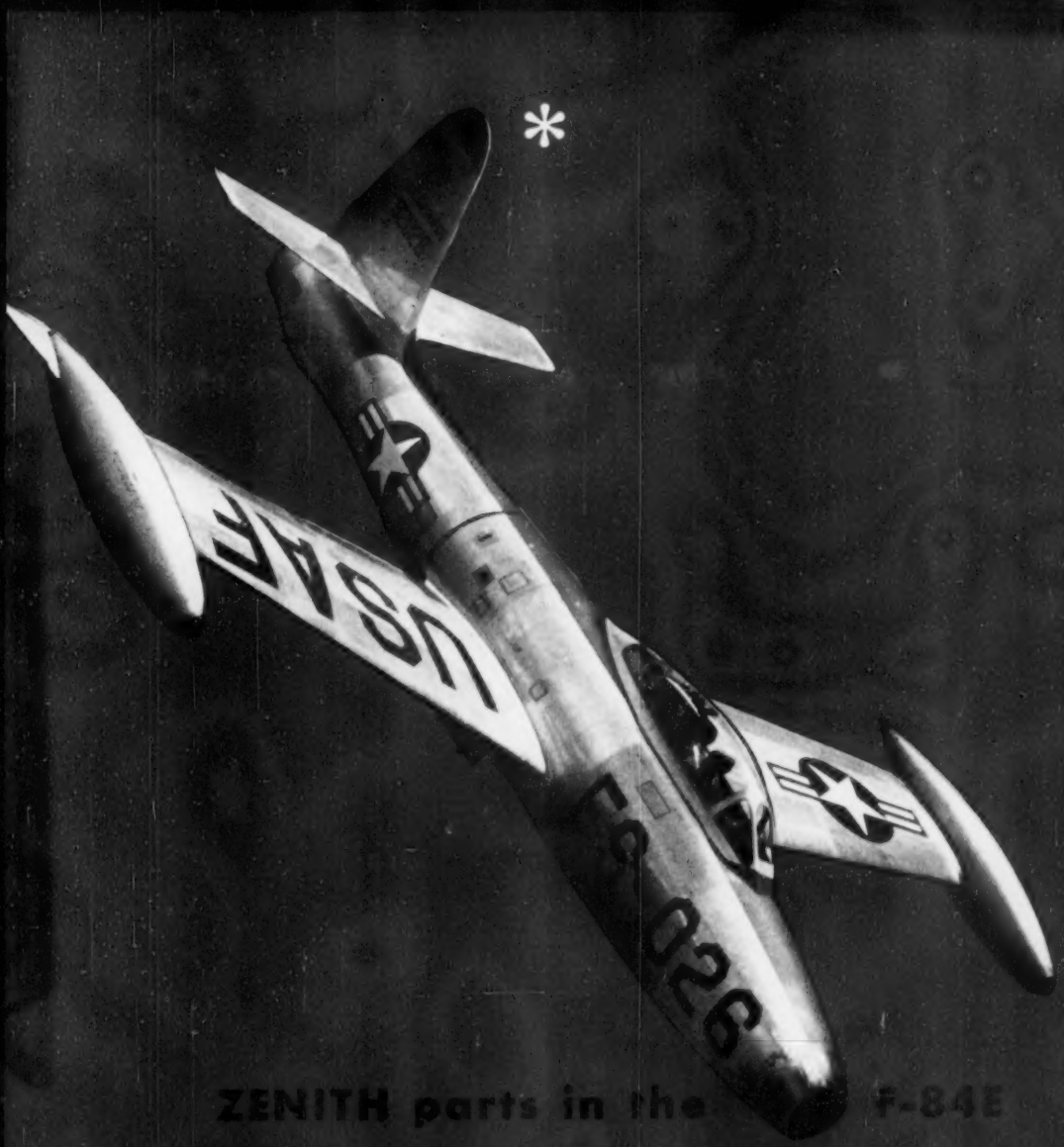

ZENITH parts in the F-84E

Plunging from the sky at meteor-like speed, Republic's USAF Thunderjet brings to bear an armament seldom concentrated in one fighting machine of its type. Every part in such a machine must be engineered with such exactitude, built with such strength to withstand terrific stresses, that it must have behind it the breadth of experience in reinforced plastics which has brought Zenith the confidence of both the USAF and the aircraft industry.

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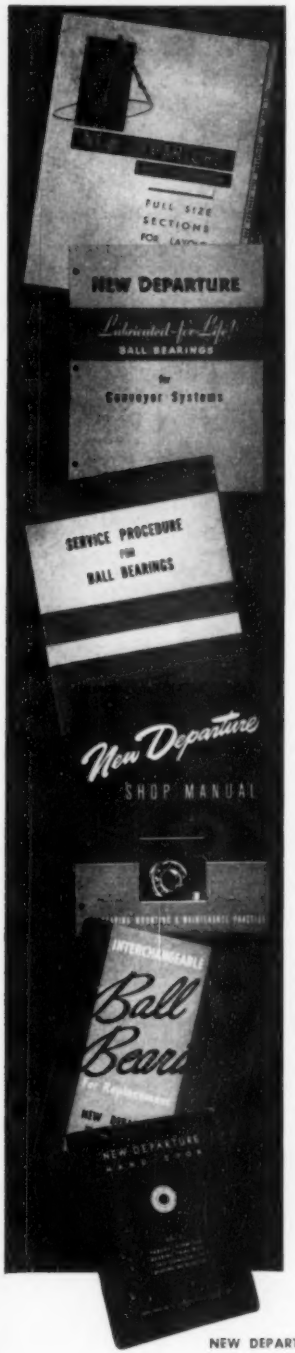

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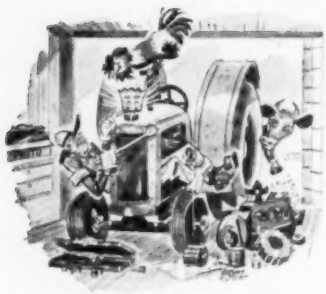

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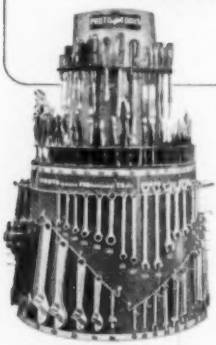

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Aviation Week

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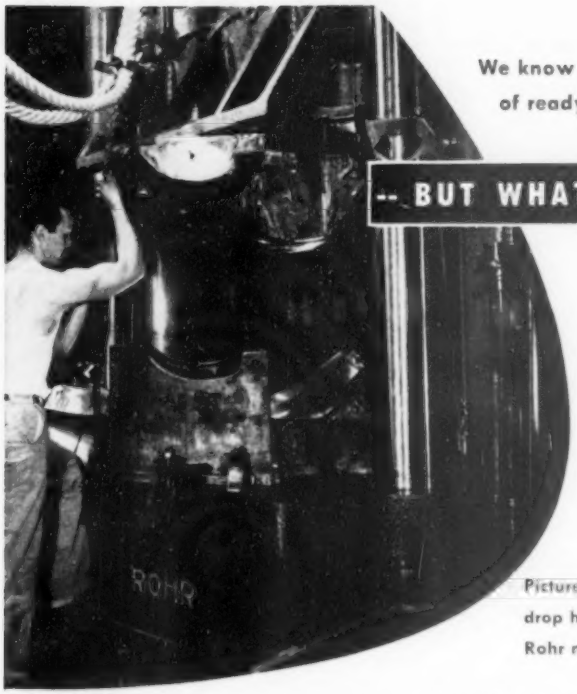

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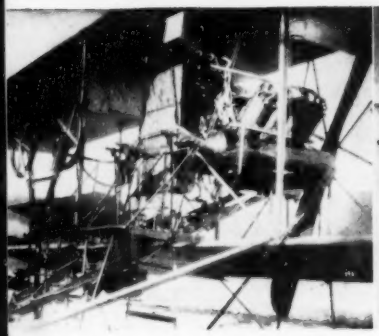
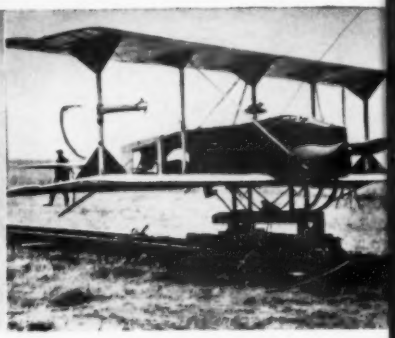
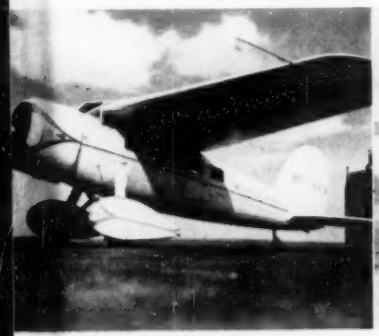


1912 The first Sperry automatic pilot was flight tested in a Curtiss hydroaeroplane in 1912 at Hammondsport, New York. This was the world's first gyroscopic automatic pilot to fly an aeroplane.

1914 Lawrence Sperry, in a public demonstration of automatic flight in Paris, 1914, won the International Safety Competition with his "stable" aeroplane.



1916 Ancestor of the guided missile was the aerial torpedo developed during 1916-18 by Sperry working with the U.S. Navy. These automatically controlled "flying bombs" were tested over Great South Bay, Long Island.

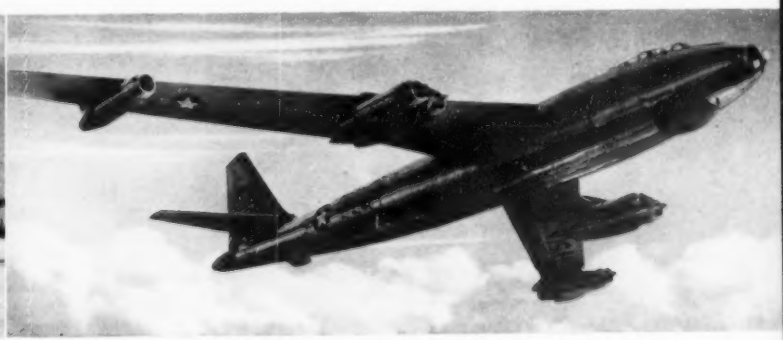


1933 Automatic flight again won public acclaim in 1933 when Wiley Post made the first solo flight around the world with the Sperry automatic pilot as his "co-pilot" in the WINNIE MAE.

1937 First completely automatic landings were made by the U.S. Army Air Corps in 1937 by coupling radio aids to the Sperry automatic pilot.

1943 The first electronic automatic pilots flew thousands of B-24's in World War II and advanced the art of precision bombing by providing an improved stable platform.

1947 The first "pushbutton" aircraft, U.S. Air Force's All-Weather Flying Division's C-54, equipped with Sperry automatic pilot and automatic approach control, crossed the Atlantic both ways in 1947 without human hands touching the controls—including take-offs and landings.



1952 The modern Gyropilot® flight control is the outgrowth of Sperry's 40 years of research, development and manufacture of automatic controls for aircraft. This versatile, all-weather pilot represents a high-performance technique for automatic control which is readily adaptable to all types of aircraft—airliners, executive craft, jets, helicopters, lighter-than-air ships and guided missiles. This technique pioneered by Sperry has led to a new fundamental concept of flight for the aircraft of tomorrow. Sperry Gyroscope Company Division of The Sperry Corporation, Great Neck, New York.

NEWS DIGEST

DOMESTIC

Colonial Airlines on Apr. 18 began 23rd year of operation without a fatality or serious injury to passenger or crew member. Colonial has flown 1,698,603 passengers a total of 470,453,503 passenger-miles since 1930 and made 588,672 landings and takeoffs.

TWA 749A Constellation was destroyed by fire while being fueled at N. Y. International Airport (Idlewild) shortly after flight from London Apr. 21. No passengers or crew were aboard, but several ground personnel and firefighters were injured. Preliminary investigation indicates that the blaze started on the fuel truck.

O. A. Wheelon, production design engineer with Douglas Aircraft Co., Santa Monica, has been awarded the Wright Brothers Medal by the Society of Automotive Engineers for his paper "Design and Manufacturing Techniques With Titanium."

Air Materiel Command's new mailing address: Wright-Patterson AFB, Ohio. New address bypasses Dayton Post Office, is expected to expedite AMC mail by as much as 20 hr.

Civil aircraft shipments in February totaled 227 planes, 761,000 lb. airframe weight, valued at $15.8 million. Engine shipments came to 395, aggregating 247,900 hp.

Two Republic F-84G Thunderjets made nonstop 4,775-mi. flight across the U. S. Mar. 25, dropping practice bombs on a California target. Planes were refueled in air by Boeing KB-29P tankers. The nonstop flight lasted a little over 11 hr.

John F. Floberg, Assistant Secretary of Navy for Air, qualified recently as a carrier pilot. Flying a North American SNJ trainer, he made three solo landings aboard the Navy aircraft carrier USS Cabot.

Navy accepted first Martin P5M-1 Marlin at ceremony Apr. 23. The 36-ton anti-sub patrol bomber carries both sub detection and destruction equipment.

FINANCIAL

Temco Aircraft Corp., Dallas, and its subsidiary, Luscombe Airplane Corp., Dallas, report unaudited consolidated net profit of $221,131 for the first two months of 1951, after provision for taxes.

Mid-Continent Airlines, Inc., suffered a net loss of $31,425 in February after adjustment for income taxes. Operating revenues were $798,335.

Douglas Aircraft Co., Santa Monica, had net sales of $81,271,045 for the first quarter ending Feb. 29, with net earnings of $1,997,096. Backlog at the end of the three-month period was $1,845,352,962.

Minneapolis-Honeywell Regulator Co., Minneapolis, had net sales of $15,150,517 in 1951; net income after taxes was $9,277,510.

Seaboard & Western Airlines, Inc., had net earnings of $702,936 during 1951 on operating revenues of $10,784,342.

Delta Air Lines reports net profits of $1,275,216 after taxes for the nine months ended Mar. 31; net income was $3,617,811.

American Airlines, Inc., had net profit, after taxes, of $984,834 for the quarter ended Mar. 31.

INTERNATIONAL

Philippine Air Lines has ordered two more Convair-Liner 340s at cost of approximately $3.5 million, with delivery scheduled for early next year. The carrier now has ordered six 340s.

Hawker Siddeley Sapphire jet engine has now achieved a thrust of 8,300 lb., the greatest thrust officially announced by any engine manufacturer. This additional power has been gained with no increase in weight or size, the maker says. The Sapphire will be built in the U.S. as the J65 by Wright Aero Corp. and Buick.

A 40-seat twin-rotor copter is to be built soon by Bristol Aeroplane Co., England, with flight tests programmed in 1955. Called Type 181, it is designed to meet BEA's specs for a craft for operation by about 1958.

Vickers Valiant four-jet bomber made its initial flight Apr. 11. This is the second prototype.

Air Vice Marshal Sir Henry Broadhurst has been named assistant chief of Air Staff (Operations), Air Ministry, instead of Air Vice Marshal L. F. Pendred, who had been announced for this post previously.

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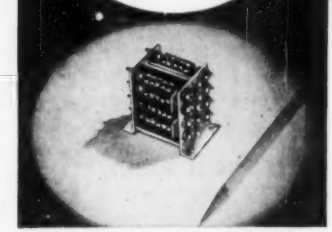

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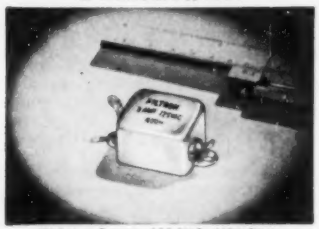

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AVIATION CALENDAR

Apr. 28—International Air Transport Assn. Warsaw Convention special committee meeting, Bermuda.

Apr. 30-May 2—American Institute of Electrical Engineers northeastern district meeting, Arlington Hotel, Binghamton, N. Y.; aviation papers Apr. 30.

May 2-4—California Aviation Education Assn. annual meeting, Los Alamitos NAS, Long Beach.

May 3-4—Sixth annual Intercollegiate Air Meet, Great Barrington, Mass.; if rain, May 10-11.

May 5-7—Symposium, "Progress in Quality Electronic Components," sponsored by Institute of Radio Engineers, American Institute of Electrical Engineers, and Radio & Television Manufacturers Assn.; technical sessions at Dept. of Interior auditorium; registration at Roger Smith Hotel, Washington, D. C.

May 5-16—International Air Transport Assn. technical conference meeting, Copenhagen.

May 8-9—Fifth annual Wisconsin Aeronautics Conference, Hotel Northland, Green Bay.

May 11—International Air Transport Assn. traffic committee meeting, Buenos Aires.

May 12-14—National conference on airborne electronics, co-sponsored by Institute of Radio Engineers' Dayton section and Professional Group on Airborne Electronics, Dayton Biltmore Hotel, Dayton, Ohio.

May 14—National aircraft technical committee, Aircraft Industries Assn., meeting, Hotel Statler, Washington, D. C.

May 14-16—Society for Experimental Stress Analysis national meeting, Hotel Lincoln, Indianapolis.

May 15-16—American Helicopter Society annual forum and banquet, Hotel Washington, Washington, D. C.

May 17-18—National Pilots Air Meet and Races, Chattanooga.

May 19—International Air Transport Assn. technical committee and medical committee meeting, Copenhagen.

May 20—Institute of the Aeronautical Sciences meeting, Cleveland-Akron section, Cleveland.

May 21—International Air Transport Assn. financial committee meeting, Rome, Italy.

May 31—Philadelphia Aviation Country Club annual spring regatta, Wings Field, Ambler, Pa.

June 1-6—Society of Automotive Engineers summer meeting, Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.

June 3—Council for military aircraft standards, Aircraft Industries Assn., meeting, Hotel Statler, New York.

June 9-13—National Fire Protection Assn. annual meeting; aviation seminar on June 10, Hotel Statler, New York.

PICTURE CREDITS

9—(top, center) Convair; (bottom) Boeing; 14—NWA; 16—Convair; 25, 26, 30—Gyrodyne.

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YB-60 GOES ALOFT—Convair's new eight-jet YB-60 sweptwing bomber is seen as it takes off for the first time Apr. 18 at Ft. Worth, powered by eight P&W J57 turbojets. In this only flight picture released by USAF landing gear has been eliminated by retouching.

The Air Is Full of Giants

Latest Photos of SAC's Big Bombers

B-36 CREW STATIONS—Retouched flight view of late model Convair B-36 shows grouping of big bomber's 16 crew members. The crew stations are connected by 85-ft. pressurized tunnel. Legend: 1, Plane commander; 2, Pilot; 3 & 4, Flight engineers; 5, Radar-bombardier; 6, Navigator; 7, Nose gunner; 8 & 9, Radio operators; 10, Forward gunner-co-pilot; 11, Forward gunner-observer; 12 & 13, Lower aft gunners; 14, Tail gunner; 15 & 16, Upper aft gunners.

YB-52 FIRST FLIGHT—Boeing YB-52 Stratofortress (eight P&W J57 jets) left the ground for the first time Apr. 15, at Boeing Field, Seattle, and landed at Larson AFB, Moses Lake, Wash. Landing gear has been touched out in this only flight view released by USAF.

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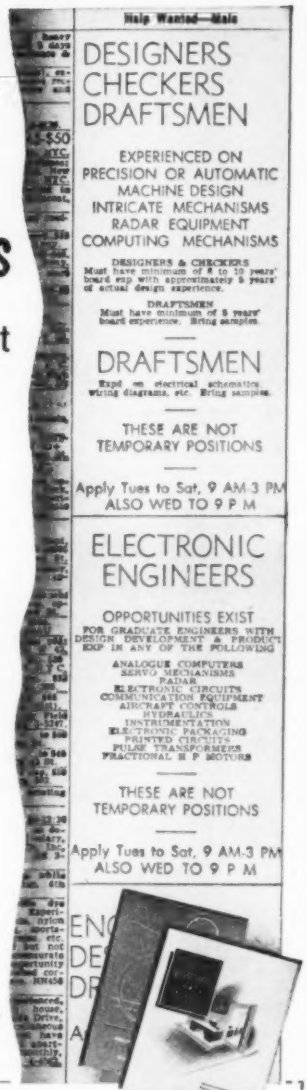

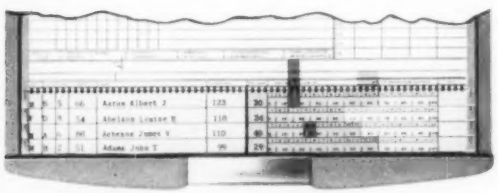

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WHO'S WHERE

In the Front Office

Gregorio A. Obregon has been made president and general manager of largest Colombian airline, Avianca (Acrovias Nacionales de Colombia). A private pilot and director of the carrier since 1946, Obregon has served in numerous private and political posts.

Edmund O. Schroeder has been elected assistant vice president-maintenance for American Airlines and will head up all day-to-day maintenance on the system's stations. He will base at Tulsa, where he has been manager of production control for the past two years. **Joseph F. Martin**, who has been AA director of maintenance, becomes assistant to the vice president of maintenance and supply.

Leon T. Noel has been named vice president-controller of Solar Aircraft Co., San Diego, and **Herbert Kunzel** has been made vice president-secretary. Noel joined the firm in 1947, was controller prior to his new promotion. Kunzel has been with the company since 1946 as secretary.

Changes

R. G. Tabors has been appointed general manager of the Aircraft Turbine department of Eddystone division of Baldwin-Lima-Hamilton Corp., Eddystone, Pa., in addition to his duties as manager of the hydraulic press and power tool department.

Robert Deihl, formerly with Convair-Ft. Worth, has been designated production manager of Aviation Engineering Corp., Woodside, N. Y. **Edgar A. Serfass** has been named manufacturing superintendent and **Charles S. Byrd** has joined the firm as production engineer.

Richard E. Stockwell has resigned as editor of Aviation Age magazine effective May 1 to join Monsanto Chemical Co., St. Louis. He will be succeeded as editor by **Robert J. Reed**, who has been the magazine's sales representative in Chicago. **Randolph Hawthorne**, now assistant editor, becomes managing editor.

Jack Purcell has jointed the Washington, D. C., staff of Hill & Knowlton, Inc., and will devote his full time to the Aircraft Industries Assn.

George T. Keller has been named manager, customer service department of Pacific Airmotive Corp., Burbank, Calif.

Worley Stapleton has been promoted to superintendent in charge of all production at Greenville, Tex., division of Temco Aircraft Corp. **E. Fred Buehring** has been promoted to assistant director of contract administration for Temco at Dallas.

Fulton Monsees has been named purchasing agent for Consolidated Vultee Aircraft Corp.'s San Diego division.

Mal B. Freeburg has been designated manager of Transocean Air Lines' scheduled service in the Trust Territory of Pacific Islands and **William H. Benge**, formerly with CAA, has been made assistant director of operations for TAL.

R. J. Zimmerman has been appointed radio and electronics system line service engineer for Northwest Airlines.

INDUSTRY OBSERVER

► Lockheed F-94C Starfire all-weather interceptor just entering production at Lockheed is equipped with all-rocket armament in place of conventional machine gun or cannon. Rockets, 24 in all, are arranged in banks of six and are recessed into the fuselage in a ring around the radar nose of the plane. At a flick of a switch, panels covering each bank of rockets recess into the fuselage baring the rockets for launching. Panels covering each bank may be operated individually or in unison at firing time. Rockets are Mighty Mouse developed by Navy BuOrd.

► **Avro Canada C-102 Jetliner, which has been used to flight-test equipment for Avro's CF-100 Canuck all-weather fighter, recently was flown to Culver City, Calif. That city is headquarters for Hughes Aircraft which is developing and producing various avionic gear for Lockheed F-94C and other all-weather fighters. Reportedly, Canada has not yet been able to find suitable radar equipment for the CF-100.**

► Pentagon Air Force personnel have reversed their field and now are urging Wright Air Development Center to put GE's new lightweight fighter gunsight into production without waiting for firing tests of an improved model, scheduled for delivery soon. Only recently, the Pentagon had been indifferent to WADC recommendations to push the new gunsight (AVIATION WEEK Feb. 4, p. 11), despite phenomenal scores in firing tests.

► **A number of airlines have expressed interest in Fairchild's forthcoming big-wing C-119H Packet as a commercial cargo carrier and the company has high hopes of developing a civilian market. If present interest blossoms into airline orders, the company anticipates little trouble in gaining Air Force permission for commercial production.**

► Some major avionic manufacturers now are convinced present omnirange and ILS navigation facilities will become the permanent system, and not an interim setup as envisioned by Air Navigation Development Board. They say ANDB and CAA planned too far into the future and that avionic development has proceeded along its own course and may lead in a direction not considered by the planners.

► **Consolidated Vultee Aircraft Corp. is conducting a new series of parasite fighter tests for Air Force. In this latest program to provide long-range bombers with their own escort fighters, a B-36 is used as mother plane to a Republic F-84 fighter. Tests are being conducted at Carswell AFB, Tex. Air Force says only: "Several air launchings of an F-84 from B-36 aircraft have been made to date."**

► Britain's Royal Aircraft Establishment is keeping close tabs on fatigue life of metals used in British aircraft, and one result is a recent Air Registration Board order that center section spars of Viking transports must be replaced after 10,000 flight hr. A long-range outcome of the RAE research may be that British manufacturers will have to build to more stringent requirements.

► **According to Bell Aircraft Corp., company is one of "the nation's seven sources" for liquid rocket engines. Others are believed to include GE, Kellogg, Aerojet, Reaction Motors, North American Aviation and Curtiss-Wright.**

► Procurement oddity resulting from the recently revised production rescheduling announced by USAF and Navy is delivery "stretchout through 1954," finds Canadair delivering more Beech T-36 transports to USAF than prime contractor Beech-Wichita.

► **Canadian defense production sources say the first batch of F-86E Sabres built by Canadair Ltd. under license from North American Aviation cost $240,000 each plus sales taxes for airframes, while engines and other components imported from U. S. manufacturers cost $78,000 plus duty and taxes per plane.**

Washington Roundup

Air Power in Politics

Air power is in the thick of politics and is likely to be more so as the weeks pass. There is a chance the aircraft program might benefit. Prospect is:

- That the stretchout of production will be checked.
- That the $710-million slash by the House in funds for the coming 1953 fiscal year, which starts July 1, ultimately will be restored.
- That USAF and Naval Aviation will be given a free hand to spend money they already have for aircraft and other hardware already on order. On July 1, USAF and Naval Air will have $20.3 billion on hand to spend for aircraft and related equipment already contracted for.

▶ **This Is Why:**

- **The President's determined stand** against House slashes in defense funds.

The President's view of the House action, in a public address: "Did they say, 'Cut down on jet airplane production—or cut down on tank production—or reduce the number of men in the service—or provide them with less ammunition?' No, no, no. They didn't face up to any of these questions. They didn't take any responsibility for saying how we should weaken our national defense. Oh, no, they didn't do that. They just took a knife and cut it and then they'd go out and brag about it."

His comment: "Our national defense program can't wait on petty politics."

His threat: to keep Congress in session from now until January—or until the defense slashes of the House are restored.

- **Sen. Robert Taft's obligation** to support at least the President's $16.6-billion aircraft procurement program for next year. He is criticizing the Administration for failure to put enough emphasis on air power, a prime issue of his presidential campaign.

Taft's comment in a campaign address: "What is our first priority? It seems obvious to me that it must be the building of an Air Force able to maintain control of the air over this continent and over the oceans that surround this continent and fully able also to deliver atom bombs for the destruction of Russian bases, fuel, supplies, communication lines and manufacturing plants. . . . If we can achieve such global air control, we should be able, with our Navy and with some defended bases abroad, to prevent the extension of Communist power across water in all parts of the world."

- **Sen. Joseph O'Mahoney's support** of air power. Chairman of the Appropriations Subcommittee now considering the House-passed 1953 fiscal year defense appropriation bill, he wants to hold down defense money—but not for air power.

▶ **But the Politicking Might Mean:**

- A drag-out fight between Congress and the President, with prerogatives as well as the defense budget the issue.
- That, as a result, funds for coming-year aircraft procurement will be held up far past July 1, start of the fiscal year.
- That Congress might take a political course: Vote funds for air power, but put an overall ceiling on defense spending.

Politically, this course would permit candidates to extoll air power and their support of it on the stump and evade criticism for scuttling the aircraft production program.

USAF: Tactical Air Showdown

Air Force is doing legal handsprings to avert a showdown on the tactical air issue—whether it should be controlled by air or ground commanders in the field, whether it should be transferred to the Army, how much emphasis should be put on it in the air power buildup.

The law states that maximum USAF strength "shall not exceed 70 groups." Department of Defense recognized the law when it requested legislation repealing the ceiling, subsequently introduced by Chairman Carl Vinson of House Armed Services Committee.

Rep. Sterling Cole and other committee members promptly announced they would insist on a thorough airing of views on tactical aviation at repeal hearings.

Now USAF comes forth with an 1,800-word legal opinion which states that repeal of the law isn't necessary.

USAF's position: "The 70-group figure . . . was intended to establish only a peacetime target." It does not "restrict the freedom and authority of the Congress to appropriate funds for the expanded Air Force program."

Airline Battles Ahead

Scheduled airlines face Washington battles on:

- **Establishment of Military Air Transport Service** as a self-supporting independent enterprise, capitalized with a revolving fund out of which it would pay costs, either for operating its own fleet or for contract operations, and be reimbursed by charges to users. This would be after the pattern of Military Sea Transport Service.

Air Transport Assn. spokesmen look on the proposition as a competitive government airline which would first capture all government traffic from the commercial lines and then edge into competition for commercial traffic.

Key advocate of the plan: Defense Department's comptroller, Assistant Secretary W. J. McNeil.

- **Merger of MATS and MSTS.** A House subcommittee, headed by Rep. Herbert Bonner, would take this step. It has urged House Armed Services Committee to act.

Airlines are opposed because they want MATS contained as a strictly military training and military transport operation and not, as is the case with MSTS, taking over non-military government transport business.

- **Lack of competition?** A Senate Small Business Subcommittee headed by Sen. Blair Moody plans hearings and investigation to determine if there's enough competition in the air transport field.

The full committee, headed by Sen. John Sparkman, will hold hearings to check on the status of the nonsked industry and Civil Aeronautics Board's attitude toward it.

The Small Business Committee is behind the nonskeds in their fight with the scheduled industry.

- **Finance CAB?** Admininstration plans to recommend before long a program to finance the airways system through user charges. But there's also a strong move in Congress to require the air industry to finance the CAB operation through payments for certificates, fees for docket filings, payments for reports and the like.

Outlook of some members of Congress: Imposition of charges might not only finance the CAB operation, but make it more efficient.

They point out: There might be fewer participants in CAB cases if there were a price tag on participation.

—Katherine Johnsen

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Mobilization Resignations Laid to Apathy

- **Boyer, Bedford stepping out of key defense jobs.**
- **Air stretchout seen as contributing factor.**

By Alexander McSurely

Mixed interpretations were heard in Washington aviation circles last week concerning the current turnover in top defense mobilization jobs following the recent resignation of Defense Mobilizer Charles E. Wilson.

Behind general swan-song statements that the defense mobilization program is well along and that major bottlenecks are now largely overcome is a serious underlying concern about the "lack of urgency" in the White House and on Capitol Hill as manifested by the stretchout in air power buildup.

If the international situation was urgent enough in mid-1950 to call for a large-scale U. S. aircraft and arms program, informed defense and mobilization officials point out, what has happened since does not justify the reductions in military budget now being put into effect on a basis of political expediency.

▶**Boyer and Bedford**—Resignations of two of the best-known and most successful bottleneck smashers of the mobilization program, Harold (Bill) Boyer, chief of Aircraft Production Board, and H. Clay Bedford, assistant to Secretary of Defense, virtually simultaneously (about May 1), could mean two things:

- Both men feel that the course for large-scale defense production, with a major emphasis on aircraft, is now well planned and that obstacles not yet overcome are well defined and action is being taken to surmount them.
- That if the Administration and Congress don't see any more urgency about the program than has been manifested recently, why should they "knock themselves out" further in routine work now that the machinery is rolling as smoothly as forthcoming budget contractions will permit?

▶**In New Jobs**—Both men came to government on an "on-loan" basis, and are now due to return to industry jobs. Neither will return to the job he left, however. Boyer is expected to become general manager of a General Motors division, while Bedford is to succeed Edgar Kaiser as president of Chase Aircraft, Inc., now in the process of moving to Willow Run, Mich.

Before his appointment last July to head the Aircraft Production Board, Boyer had been director of production engineering at General Motors Corp. During World War II he had been chief of Aircraft Manufacturing Branch of War Production Board.

Bedford was executive vice-president of Kaiser-Frazer Corp. last summer when he was loaned to Defense Mobilizer Charles E. Wilson and became Deputy Administrator of Defense Production Administration and Chairman of the Production Committee. About the first of the year (AVIATION WEEK Dec. 31, p. 16) he was appointed Expediter of Military Production in the Defense Department with status of Assistant to Defense Secretary Lovett.

▶**Boyer Interview**—In a final interview before leaving to return to his industry job last week, Boyer told AVIATION WEEK:

"The No. 1 stumbling block in military aircraft production is still the availability of special machine tools. Delivery dates run up into late 1953 and early 1954 for some of the tools and increased production will be held up accordingly. Principal shortages are in turning and grinding tools."

The APB chief said second sources on aircraft engines were just beginning to get into production and will be a major factor in overall aircraft powerplant production before the end of this year.

▶**More Engines**—Production currently is running at around 1,000 engines a month, mostly jets. Additional engine production from automotive second-source producers will be phased into production of regular aircraft engine makers in a steady increase.

Chevrolet will produce its first

Stretchout 'Inexcusable Risk': Spaatz

Opening a Senate drive to restore the buildup of air power, Senate Preparedness Committee last week heard Air Force's first Chief of Staff, Gen. Carl Spaatz, now retired, brand the stretchout of aircraft production "a serious and inexcusable risk rather than a calculated risk."

"Instead of talking about a stretchout, aircraft manufacturers should be required to produce as fast as possible," he told the Senate group headed by Sen. Lyndon Johnson. "There are likely to be more Koreas—any of which could spark off World War III—as long as we don't have an Air Force to make Mr. Stalin think twice."

▶**His Analysis**—Under the Administration's plan to postpone achievement of a 143-wing USAF from 1954 to 1955, he reported, aircraft production would be reduced from a rate of 1,800 planes a year by the fall of 1953 to 1,250. Under the additional cut in funds for aircraft and related procurement and the limitations clamped on expenditure rate by the House, Spaatz estimated that the plane production rate would reach only a 1,050-a-month tempo by the fall of 1953.

He gave "a very rough" estimate that a year's stretchout would add $2 billion to the cost of buildup because of increased overhead cost and lower volume production. After achievement of the 143-wing USAF, replacement of 25% of the planes annually would be required to keep the force up-to-date, he said.

▶**Need Strong AF**—Russia, Spaatz pointed out, has been able to supply and sustain the Chinese Communists with a force of 900 MiGs at the point of impact in Korea and still take care of other requirements while the U.S., "the greatest air power in the world" can afford only 150 planes in the theater capable of meeting the MiGs in combat.

He sees necessity for buildup of a Navy "capable of controlling the seas" and having "enough doughboys," but gives air power first priority "because other forces won't be effective until we have an effective Air Force."

Wright R3350 engines at its North Tonawanda (N. Y.) plant in June. Studebaker is due to get out its first General Electric J47 engines this month or next. Packard is due to start its J47 production in June or July. Buick will deliver its first Wright J65 Sapphires this fall, and Ford has already delivered several Pratt & Whitney R4360 engines from its Chicago plant, the APB chairman summarized.

▶ **"Could Be Tough"**—Materials now appear in ample supply for the currently planned aircraft production, but "things could be tough if emergency forced monthly production goals up again," Boyer said.

A few critical materials such as cobalt, nickel, columbium and titanium are most likely to cause trouble in such a case, he said. Aluminum situation is being eased by the increased production, and no longer appears a serious problem.

Air Force's forge press program for aircraft is moving along as another long-term plan, and its effects won't be felt in the production picture for another year-and-a-half to two years, Boyer said.

▶ **Most Important**—He considers among the most important achievements of APB during the last nine months: opening up of the machine tool situation; establishment of definite priorities for key aircraft and engines through "Operation Brickbat" and through Bedford's cooperative efforts, and the solution to the aircraft accessories B-products logjam, which for some time threatened to delay many of our most important planes.

Boyer paid tribute to his assistant, Allan Rankin, for his work on the B-products problem which recently resulted in a final Munitions Board directive providing that the Aircraft Production Resources Agency will establish controlled materials requirements for certain B-products for the aircraft program, which are to be designated APRA B-products.

Commencing with the fourth quarter of 1952, these will be consolidated with other military aircraft materials requirements before the complete military aircraft requirement is submitted to DPA. Originally, the accessories had not received a sufficient CMP priority and were handled under NPA. The result was that many accessory manufacturers reported they were not receiving sufficient materials allotments to meet their schedules. (AVIATION WEEK Sept. 24, p. 220, Oct. 1, p. 13, Oct. 15, p. 15).

▶ **Consolidation Coming?**—The resignations of Boyer, who overstayed by four months his original six-month leave from GM, and Bedford may result in a consolidation of aircraft production planning with other DPA activities, observers forecast last week.

Looming as a probable future key figure in aircraft production for DPA is William L. Campbell, who succeeded Bedford as Deputy DPA Administrator and Chairman of the Production Committee. Campbell's assignment heretofore has been to handle virtually everything else but aviation, and he worked closely with Bedford on that.

DPA Administrator Manly Fleischmann said that he had not yet determined who Boyer's successor would be.

Fleischmann himself is still being considered as the most probable successor to Defense Mobilizer Charles Wilson, but the post is still being temporarily filled by Dr. John Steelman, Assistant to President Truman.

Some B-Products Controls to APRA

Finally recognizing that aircraft parts are 90-95% war products, the DPA and NPA have relinquished CMP priorities control of many B-products to APRA—the Aircraft Production Resources Agency at Wright Field.

Both civil and military claimants will apply to APRA for material allocations on these aircraft items, starting with applications for the fourth quarter of this year (they now will be designated as "APRA B-products"):

Accumulators, hydraulic; actuators, linear motion, electric; actuators, linear motion, hydraulic; actuators, linear motion, pneumatic; airspeed and mach indicators; altimeters; automatic flight control systems; brakes; brakes, debooster; bourdon instruments; compasses; conduit, electric, braided metallic; coolers, oil and air; filters, engine air; fuel pumps and assemblies; fuel gauge, capacitor type; gearmotors, special aircraft; generators, electric, special aircraft; gyro instruments; hardware, parachute; hardware, safety belt and harness; heaters; indicating instruments, electric, synchronous; inverters, electric; landing gear struts and assemblies; motors, fractional hp, special aircraft; motors, hydraulic, special aircraft; motors, rotary pneumatic; hydraulic pumps, accumulators & assemblies, special aircraft; pilots, automatic; rate of climb indicators; regulators, oxygen, respiration; sextants, periscope; spark plugs; starters, electric; tachometers, electric; temperature, indicating instruments, electric; turn and bank indicators; towing equipment airborne; vacuum pumps & assemblies; valves, hydraulic control; wheels.

NWA FIGHTS THE FLOOD

Northwest Airlines' big overhaul and maintenance base at Holman Airport, St. Paul, gets wet during the worst flood in the history of the upper Mississippi River area. More than 700 airline employes—including executives and mechanics—fought a "round-the-clock battle to save the installation from being washed out. Photo above shows NWA's two 600-ft. hangars still dry though the airport is covered with water. A half-mile, 5-ft. dike around the base held, although water was allowed to come in later to prevent the dike's buckling. NWA flew its planes to Minneapolis, excepting one DC-4 which had not been damaged by the flood at the time this picture was taken.

RAAF Wants More P2V Neptunes

(McGraw-Hill World News)

Melbourne—The Royal Australian Air Force is asking the government to increase its initial order for 12 Lockheed P2V Neptunes, in view of the importance of anti-submarine strategy in Australia's military plans. The government is said to be ready to allocate dollars for more Neptunes, provided it can get early delivery.

The RAAF is also interested in buying some U. S.-built North American F-86 Sabre fighters to fill the gap until Australia gets its own F-86 production going, but chances of getting any appreciable number are believed small.

Mixed Reactions Greet AMC Plan

Officials go ahead with decentralization of buying in face of cautious pleas for more study.

By Byron C. Dempsey

Dayton, Ohio—Factions at loggerheads over proposed decentralization of Air Force procurement here are awaiting the aircraft industry's reaction to the plan.

Meanwhile, local response, both in and out of Air Materiel Command at Wright-Patterson AFB, has been clear-cut for or against the system which is being implemented gradually.

Lt. Gen. E. W. Rawlings, AMC commanding general, can produce figures and charts pointing up overall savings in money and a more efficient operation with the "farming out" of related supply, maintenance and procurement functions to 15 subordinate AMC installations.

While conceding that supply and maintenance functions can be done at outlying stations, opponents contend that procurement cannot be separated from neighboring Wright Air Development Center engineering and project officers without increasing administrative costs and delaying purchase schedules.

Sharply divided opinions are offered on all facets of the proposal.

▶ **Overcrowding:**

• **Pros**—Decentralization is necessary to alleviate jammed working areas, traffic, housing facilities, mail handling and food service for approximately 36,000 employes, military and civilian, in AMC, WADC and tenant organizations at the base. Gen. Rawlings has declared that all of those conditions will be eased with complete decentralization.

• **Cons**—Removal of supply, maintenance and some tenant organizations would accomplish the same goal. As an example of the latter, USAF Institute of Technology is cited. The institute occupies a large portion of Bldg. 125 in Area B—in proximity to existing procurement offices as well as engineering laboratories. That space could be converted to use by procurement units.

▶ **Efficiency:**

• **Pros**—Smaller supply-buying-distribution units will promote effective logistical handling of Air Force equipment. Gen. Rawlings emphasized that point: "Last week we announced plans to transfer our ground communications and electronics functions to Griffiss AFB in Rome N. Y. Why select that base? It is a specialized depot at which all ground communications and electronics equipment is stored and prepared for shipment to wherever it is needed by the Air Force throughout the world.

RAWLINGS: Save time, save lives.

"It only makes sense to put the people who are charged with the procurement of that type of equipment at the place where the materiel is stored, maintained and distributed. By so doing we eliminate the necessity for considerable letter writing and long distance telephoning because the man who had the answers at Wright-Patterson now will be in the next office or the adjoining building.

"Questions which formerly took days or hours to answer in lengthy letters or expensive telephone calls can be resolved in a matter of minutes. This saving of time—manhours if you will—not only results in a dollar economy but in a speed-up of delivery of materiel to Air Force units. You can place a dollar value on the manhours saved but the measurement for having the materiel on the combat front when it is needed can be computed only in the lives which would have been lost without it."

• **Cons**—What about engineering changes during lifetime of the contract? Opponents charge that the savings of time and or communications between any combination of supply, maintenance and procurement is minor compared to increased loss of the same factors because of separation of engineering and procurement. Except for standard off-the-shelf items, they point out, a heavy percentage of contracts are subject to fabrication changes which require close liaison between engineering laboratories and procurement. Assignment of engineering liaison personnel at the depots will not be the solution, critics declare, for laboratories are to remain at Wright-Patterson AFB.

▶ **Cost (Air Force):**

• **Pros**—Government cost of transporting personnel, families and household furnishings to new locations is explained by Gen. Rawlings: "Those of you who are in business know that very often it is necessary to spend some money in order to increase efficiency and net greater savings. Obviously, the government has a considerable investment in these people.

"They have been selected and trained in their jobs; and in order to capitalize on this experience, a considerable number of them will be required as the nucleus for getting the operation underway without delay at the new locations." Approximately 2,000 persons will be moved to new locations. Reason: It would take from six months to a year to train personnel to handle their duties.

• **Cons**—Critics contend that in addition to transferring 2,000 employes, it also will be necessary procurement-wise to establish additional positions at each of the depots. Example: A "procurement committee," required by Armed Services Procurement Regulations for review of all contracts exceeding $100,000. Costs of training personnel will balloon because hundreds of employes have indicated reluctance to leave Dayton. The same critics point out that the 1942 decentralization of aircraft tool procurement lasted only about six months before the function was returned to Dayton.

▶ **Cost (Industry):**

• **Pros**—Little has been said on this point by decentralization proponents. Certain inconveniences to contractors will be occasioned because not enough AMC functions will be concentrated in major industrial areas under the program, which calls for utilization of depots from coast to coast. Most stress on this phase has been increased efficiency, which would imply faster service.

• **Cons**—This is where critics are concentrating heavy artillery. With the exception of airframe, engine, propeller and larger government-furnished equipment, present and potential contractors will have to do business with at least two installations—one where procurement is processed, the other at Wright-Patterson AFB engineering laboratories. Additional travel will prove more expensive to sources of Air Force supply. There is no indication, in early stages of the decentralization, that manufacturers will be compelled to do business with only two installations of the organization.

In the case of textiles, the producer of cargo parachutes would see procurement officials at Middletown, Pa., project officers at Dayton and, if he's interested in personal clothing including personal parachutes, with the spe-

cialized depot at Shelby, O. Another example: One type of office machine is purchased by the Air Force from one of three major producers. Two are in New England and the third is at Detroit. All three are unhappy over procurement of this item being transferred to Chelı AFB just outside Los Angeles.

Critics also point out that these extra expenses will be reflected in additional costs to the government in the form of allowable administrative costs. Not only will the contractor get back additional costs, but will obtain the same profit percentage as on the entire contract.

▶ **NAMR View**—In a cautiously worded statement, National Association of Manufacturers' Representatives, with headquarters in Dayton, adopts a "wait-and-see" attitude.

Spokesmen for NAMR said that while decentralization may be a partial solution to overcrowded conditions, it remains to be seen "what effect this will have on manufacturers and contractors who up to this time have been able to maintain complete contact for liaison and maintenance service at Dayton. Manufacturers' and contractors' representatives, many of whom are engineers, have lent their experience and assistance to buyers and engineers at Wright-Patterson AFB in interpreting and evaluating specifications, drawings, proposals and quotations.

"Functions of manufacturers and contractors are many and varied; a single point of contact for their services has been invaluable in aiding the defense effort. This (decentralization) move should have a material effect on small business which previously had a central point to obtain information on prime and sub-contracting."

Some idea of the scope of the decentralization, geographically, is in the location of AMC installations. The list includes Rome, N. Y.; Middletown, Pa.; Warner Robins, Ga.; Mobile, Ala.; San Antonio, Tex.; Oklahoma City, Okla.; Memphis, Tenn.; Topeka, Kans.; San Bernardino, Maywood and Sacramento, Calif.; Ogden, Utah; Spokane, Wash., and Gentile AFB, also near Dayton.

Funds Delayed, CAA May Trim Payroll

A sharp curtailment of Civil Aeronautics Administration salary funds and dismissal of more than 1,500 employes over the next two months was in prospect last week.

These factors were in the picture:

• CAA requested a $6,150,000 supplemental appropriation to cover salary increases. Legislation raising pay of Federal workers was enacted after CAA's budget for the current 1952 fiscal year, which ends July 1; funds for the increases were not provided in the original budget.

• House slashed $750,000 off the CAA request, and Senate Appropriations Committee concurred. Outlook for restoration of the funds on the Senate floor was dim, and the prospect that such a restoration would hold in final action was even dimmer.

• If the $750,000 cut stands, Deputy Administrator F. B. Lee reported to the Senate Appropriations Committee, CAA will be forced to curtail its program for the next two months by $1,350,000. The retrenchment would be necessary, he said, so that CAA could absorb the $750,000 and an additional $600,000 in terminal leave payments out of funds it has on hand for operations between now and July 1.

• This would necessitate dismissal of 1,500 employes and the elimination of services with the cost equivalent of maintaining 47 airport traffic control towers and 91 aeronautical communications stations for 2½-month period, Lee said.

▶ **Sharper Curtailment**—Stipulating that these calculations are based on the assumption that the reduction program would go into effect Apr. 15, Lee said in his testimony to the Senate Committee that an even sharper curtailment would be necessary if the retrenchment program were put off to a later date.

Reporting that CAA has reduced its employment by 318 since last July, Lee said CAA now has 14,579 employes in general operations: Washington, 1,204; regional headquarters, 2,047; field locations, 11,328.

Functionally, CAA's employment looks like this: Operation of federal airways, 10,907; aviation safety, 1,613, and airport development, 137. The remainder are divided between administration, 1,086, and miscellaneous staff and service offices, 836.

Bernhard Urges Use Of European Plants

The American aircraft industry should use the available productive capacity of continental European aircraft and engine factories to strengthen the defense of the Atlantic world, says Prince Bernhard of the Netherlands.

In a speech prepared for delivery at the National Aeronautic Meeting of the Society of Automotive Engineers last week in New York, Bernhard stated that about 5 million sq. ft. of factory space is now non-productive, that 5,000-6,000 machine tools will be idle for lack of orders during the next few years. And he underscored the fact that skilled labor is available in abundance on the continent.

▶ **Other Proposals**—Bernhard made several other concrete proposals for better cooperation between the European and American aircraft industries. He suggested that spare parts for American civil aircraft operated by European carriers could be built on the continent, thus reducing the time lag in parts procurement. Continental design offices, said Bernhard, are staffed with men of imagination and inventive ability. Prototypes could be produced by different firms and tested on a competitive basis by one test center placed at the disposal of the Atlantic community.

And he advised the American industry not fear competition from the continental industry in small markets. "You will discover new opportunities for yourself, while at the same time you will strengthen the power of resistance of the Atlantic community as a whole."

Get in the Scrap—Turn Yours in for Defense

CONVAIR 340 GETS UP ON ONE ENGINE

Convair-Liner 340 bearing United Air Lines' insignia takes off from Lindbergh Field, San Diego, Calif., on one engine at maximum gross weight of 47,000 lb. Note port prop is feathered (circle). The single-engine take-off demonstration was staged for a committee which had been sent from Air Line Pilots Assn.

French Leader Urges African Air Industry

(*McGraw-Hill World News*)

Paris—Establishment of a large international aircraft manufacturing center in North Africa is being proposed to the North Atlantic Treaty Organization by French Secretary of State for Air Pierre Montel. He expects the proposal to be given serious consideration at a NATO meeting later this year.

Montel said he discussed the proposal with U.S. Secretary of the Air Force Thomas Finletter in Washington last February. He said it was decided then to await the report of a mission of American aviation experts who will make a study this summer of Europe's aircraft building capacity before going into further discussion of the project.

A survey by the American technical mission, Montel said, certainly would reveal that Western Europe's current aircraft manufacturing facilities, even if used to capacity, could not supply all the planes needed for defense. He said his proposal would supplement existing production capacity by creating an integrated "European" aviation industry far from the danger zones of the cold war.

Montel's proposal called for all member nations of NATO to contribute to creation of this European aviation industry—which presumably would be located in French Algeria or the French protectorates of Morocco or Tunisia—for the purpose of boosting Western Europe's plane-building capacity to a point where the European NATO nations would be able to support strong air forces more or less independently of production from the United States.

Wisconsin Students Get Flight Insurance

Flight insurance to cover students using air travel in connection with their school work is to be made available in the state of Wisconsin under a 1951 legislative act.

The legislature authorized the State Aeronautics Commission to act as agent for issuance of flight policies. An insurance firm has agreed to this coverage:

- Ten cents per $1,000 per trip.
- Payment of medical costs up to $100 per $1,000 insurance for non-fatal injuries.

Several Wisconsin high schools and colleges have added aerial field trips to their curriculums, but others had refused because of previous lack of insurance coverage.

Atlantic Coach

- **Airlines poised for first tourist takeoffs May 1.**
- **New ocean coach plans announced by carriers.**

Trans-Atlantic air tourist service, expected to increase ocean air travel this year to 600,000 or more passengers, starts this Thursday as soon after midnight as competing carriers can get their planes in the air.

May 1 is the official opening date of the new service, agreed upon at Nice, France, last December at a meeting of interested parties in International Air Transport Assn. And planning to start service from New York very early in the morning of that date are El Al Israel Airlines, KLM, Pan American World Airways and TWA. Trans-Canada Air Lines will begin service the same date from Montreal.

IATA last week furnished this breakdown of the various carriers' plans:

- **Air France.** First flight westbound from Paris May 1, first flight from New York following day. Starts with two flights a week in each direction, will be operating seven by June 15. After that date, two will go via Montreal, one via Boston. Will use Constellations seating 59.
- **BOAC.** First flight westbound May 1, first flight from New York May 3. Starts with two flights a week in each direction, will be operating six by June 13. One flight a week will stop at Boston until June 13, after that two flights a week. All flights stop at Glasgow. Opens Montreal-London service May 10 with one flight a week, increasing to two a week June 11. Will use Constellations seating 68.
- **El Al.** Will operate two flights each week between New York and Tel Aviv via London, Paris and Rome, using Constellations seating 59.
- **KLM.** First flight eastbound from New York and westbound from Amsterdam May 1. Also will serve London, Geneva, Frankfurt, Rome, Paris, Zurich, Duesseldorf and Munich. Starts with three flights a week in each direction, increasing to four on May 25, perhaps to five later. Will use DC-6Bs seating 75.
- **LAI Italian Airlines.** First flight eastbound from New York May 3, first flight westbound from Rome May 6. Will operate one flight a week in each direction via Shannon and Milan, using DC-6s seating 48.
- **PAA.** Starts with seven flights a week in each direction between New York, Shannon, London, Paris and Duesseldorf, increasing to 12 in June and July and serving in addition Rome, Glasgow, Frankfurt and Amsterdam. After Aug. 1 will operate 15 services a week in each direction. Will use DC-6Bs seating 82.
- **Sabena.** First flight westbound from Brussels May 1, first flight eastbound following day. Starts with three flights a week each way between New York, London, Paris, Brussels and Amsterdam, increasing to four June 21, six July 1. Until July 1 will use DC-6s seating 44 tourists, 16 first-class passengers. After July 1 also will use DC-4s seating 53.
- **Scandinavian Airlines System.** First flight westbound from Stockholm May 1. Starts with four flights a week each way between New York, Prestwick, Hamburg, Helsinki, Stockholm, Copenhagen and Oslo, increasing to eight from May 25 to Sept. 20. Will use DC-6Bs seating 80 and DC-6s seating 60.
- **Swissair.** First flight westbound from Zurich-Frankfurt May 2. Starts with one flight a week each way, adding a New York-Geneva-Zurich flight June 4. Will use DC-6Bs and DC-4s seating 50 until July 31, then same planes seating 68 and 55 respectively.
- **TCA.** Starts with seven flights a week each way, all stopping at London, two a week at Paris, four at Glasgow and one at Shannon. Will use DC-4Ms seating 48.
- **TWA.** First flight westbound from Paris, eastbound from New York May

TCA Silencer

Montreal—Passengers on Trans-Canada Air Lines' ocean North Stars soon will be getting a lot quieter and more comfortable ride. The carrier's liquid-cooled Rolls-Royce 620s will be muffled by a new cross-over exhaust system developed by M. W. MacCleod, supervisor of job methods and development. The new exhaust directs the engine blast away from the cabin, cutting noise to somewhere around the level in the Douglas DC-4.

At the same time the airline is adding eight seats to the four-engine transports, boosting seating capacity to 48. This is being done by an interior rearrangement which leaves more room between rows than before.

One of the reworked North Stars with quieter exhaust and more seats has already flown about 400 hr. TCA's entire fleet of 23 will get the new treatment, starting June and probably ending by September.

I starts with seven flights a week each way between New York, London and Paris, increasing to 12 on June 1. Will use Constellations seating 60.

All fares for the new tourist service are based on a New York-London roundtrip rate of $486 from April through October and $417 from November through March. All carriers involved, except El Al and TCA, will continue to offer first-class as well as tourist service. Those two will operate only tourist service planes across the Atlantic.

As far as passengers are concerned, the only major differences (other than price) between first-class and tourist service will be reduction of baggage allowance from 66 lb. to 44 lb. and a small charge for meals. TCA, for instance, is charging about $1.50 per meal; TWA is selling books of meal tickets for $4.00. Passengers may carry their own meals.

Convair Interest in Car Field Reported

Definite word on whether the Convair, Atlas, Kaiser-Frazer merger will go through can be expected in about two weeks, Floyd B. Odlum, chairman of the board of Consolidated Vultee Aircraft Corp., told his board of directors last week.

Odlum, who also is president of the Atlas Corp. which figures in the merger, made the statement in a formal talk to the directors at a San Diego meeting.

However, a new twist in the merger talk was given in a published report quoting Odlum as expressing interest in the K-F automobile manufacturing program. The report quoted Odlum as telling the directors: "If there isn't a good future in the automotive possibilities of the merger it will not be recommended."

This statement came as a surprise to the aircraft industry and to some within the Convair directorship who have long known of Odlum's desire to form a so-called "General Motors of the aircraft industry."

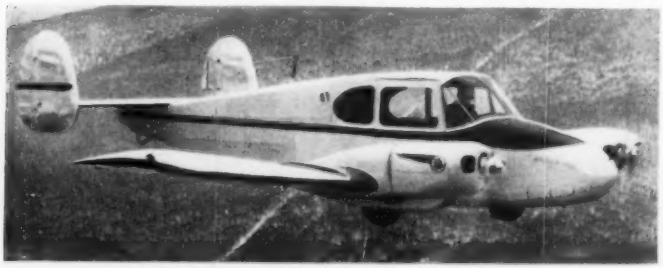
▶ **AF Reaction**—Air Force officials have been following the progress of the proposed merger with somewhat mingled feelings since USAF holds recapture rights to the huge Kaiser-Frazer-owned Willow Run facility and owns outright Convair's large Ft. Worth facility.

Some Air Force quarters have expressed satisfaction unofficially over the proposed merger, believing it would ease some red-tape problems inherent in aircraft research and development programs. Other quarters, however, expressed fear such an organization might have a dampening effect on the competitive spirit that now exists in the industry.

Odlum said a committee of directors has been appointed to consider the facts and analyses of the merger proposal when they are completed. He said the committee had received no data yet but "it is expected that the analyses will be in hand within the next two weeks." And he indicated he would be more conversant with the merger possibility at that time.

▶ **Plans Changed**—Odlum declared that at the time of first conversations with Kaiser-Frazer (AVIATION WEEK Mar. 31, p. 13) it was thought possible Convair would need a new plant to accommodate the company's B-36 modification and maintenance contract with USAF.

"We were primarily checking to see if the Willow Run plant of Kaiser-Frazer would be usable in this respect. We found that the use of the plant for the purposes stated is not feasible, but that the plant was very satisfactory for manufacture of smaller sized planes and for numerous other types of work." It was from those beginnings, he said, that merger considerations had developed.



PIPER TWIN-STINSON TRIES ITS WINGS

The new four-place Piper PA-23 twin-engine light transport is seen in the air near its home grounds, Lock Haven, Pa. Powered by two 135-hp. Lycomings, the Twin-Stinson has been designed to sell for less than $25,000, is expected to go into production next year. It grosses 3,200 lb., weighs 1,950 lb. empty. Cruising speed at sea level is given as 150 mph., stalling speed 58 mph. Cruising range is 720 mi. Wheels protrude slightly when retracted to take up shock in emergency wheels-up landing condition.

Kidde Establishes Nuclear Energy Lab

Commercial application of nuclear energy is the primary objective of the Walter Kidde Nuclear Laboratories, Inc., established recently as an associate organization of other Kidde enterprises including Walter Kidde & Co., Inc., makers of fire protection and pneumatic systems for aircraft.

The laboratories, the first privately financed group of its kind, will do research, development and experimentation. Services of the firm will be available to other groups interested either in design of nuclear energy powerplants or applications of nuclear technology to processes and products.

Technical direction of the labs will come from Dr. Karl Cohen, a pioneer in early nuclear work. Dr. Cohen and Dr. W. I. Thompson, chief engineer for the labs, have recently been directing research toward the development of low-cost reactors for commercial application.

Development and engineering offices of the new group will be located at 140 Cedar Street, New York, N. Y. Laboratory facilities will be on Long Island. The initial staff of 30 scientists and engineers is expected to grow to 100 during the next one or two years.

Members of the company's board of directors: John F. Kidde, president, Walter Kidde & Co., Inc., Walter L. Kidde, Drs. Cohen and Thompson, Henry K. Norton and William Collins.

Australia Orders Pilotless Planes

(McGraw-Hill World News)

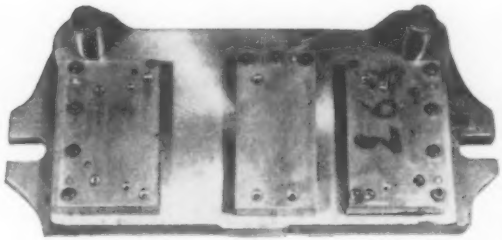
Melbourne—An undisclosed number of Australian-designed pilotless jet aircraft have been ordered by the Australian government. Chrysler (Australia) Ltd.'s Finbury factory will take a major part in the production.

The little aircraft has a span of less than 20 ft., is powered by an Armstrong Siddeley Adder (AVIATION WEEK Jan. 7, p. 24). It was developed by the government aircraft factories of the Australian Department of Defense Production, Melbourne.

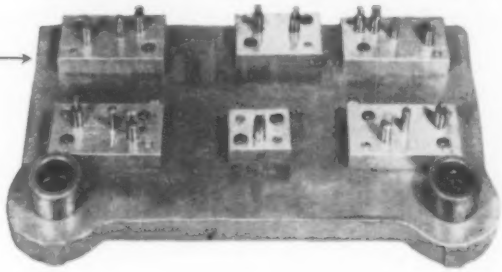
Although no figures have been released, the order is believed to cover a reasonably large number of the craft. They will be delivered to the Woomera long-range weapon station. It is reported that the pilotless missile may be used during the test of the British atom bomb.

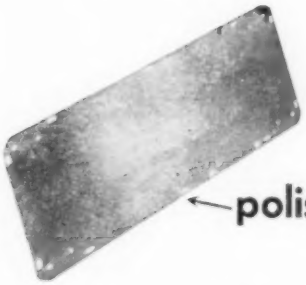
Put Your Scrap Back to Work

Die repairs eliminated →



punch life increased →





← polishing of stampings no longer needed

. . . with dies made of Graph-Mo steel

STAMPING out stainless steel parts for medical sterilizers was causing trouble for the Pelton & Crane Company, Detroit. The dies they were using—made of an ordinary tool steel—became worn after only a few hundred stampings. Holes in the parts were ragged, requiring polishing. The punches were continually chipping and cracking.

They then tried dies made of Graph-Mo—one of four Timken® graphitic tool steels. After 12,000 stampings, the Graph-Mo dies still showed no signs of wear. Stampings were clean and smooth. No polishing was needed. Pelton & Crane reports: "The fact that Graph-Mo stands up on stainless steel, where other types we used continually broke down, leads us to believe there is no finer tool steel on the market today than Graph-Mo."

Graph-Mo offers many advantages in dies and punches. Because of free graphite in its structure, Graph-Mo has minimum tendency to scuff or gall. Because it contains diamond-hard carbides, it offers unusual resistance to wear. Graph-Mo has excellent stability. Surfaces may be finished to precision tolerances. Machining is far easier than with ordinary tool steels. And Graph-Mo's uniform response to heat treatment prevents distortion in hardening.

For further information, write on your company letterhead for new, 10th edition of Timken Graphitic Steel Data Book. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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DISTRIBUTORS IN PRINCIPAL CITIES

Little Hope Held For Capital Airport Funds

Prospects for a second major airport for the national capital continue dim.

Senate Appropriations Committee concurred in House action to turn down Civil Aeronautics Administration's request for $1.6 million to complete planning and land purchasing for the proposed field near Burke in Fairfax County, Va. CAA has already spent $1 million on the project.

Secretary of Commerce Sawyer put in a final plea for the funds urging Congress "not to wait until it is prodded or scared into action by some great tragedy." Even if the funds are granted now, he said, "There will be a terrific demand for the facilities of this new airport before it will have been completed."

Opposition to the new airport comes mainly from economy-minded members and the Maryland delegation which favors use of Friendship Airport, near Baltimore.

Meanwhile, Rep. Lansdale Sasscer has introduced legislation which would turn over operation of Washington National Airport to General Services Administration. Operation is now under CAA.

RAAF Cuts Back On Lincoln Output

(*McGraw-Hill World News*)

Melbourne—The Royal Australian Air Force is cutting back its A. V. Roe Lincoln contracts, feeling that the World War II-designed four-engine bomber is obsolete and that there is no reason for Australia to continue producing the planes.

The remainder of the contract to be concluded will be for radar-equipped long range reconnaissance planes. Some of the Lincolns now in service will also be converted to these duties.

Wetmore to Leave Smithsonian Post

Dr. Alexander Wetmore, Secretary of the Smithsonian Institution since 1945, will retire Dec. 31. A member of the National Advisory Committee for Aeronautics, he contributed toward healing the breach between the institution and the late Orville Wright which led to the Wright brothers' Flyer being returned from England for display in the Smithsonian National Air Museum.

Dr. Leonard Carmichael, now President of Tufts College, Medford, Mass., will succeed Dr. Wetmore.

Paul Garber, who has been Curator of the National Air Museum, is promoted to Head Curator of the museum with the retirement Apr. 30 of Carl Mittman. Mittman has held the post of Assistant to the Secretary, in charge of the National Air Museum.

There are no immediate plans for completing the new National Air Museum building, a project which has been planned for many years but for which congressional funds are not expected to be available soon. Meanwhile, the Smithsonian's aeronautical collections continue scattered in its Washington buildings and in storage at Chicago.

Dr. Wetmore, who is an ornithologist, will continue active in his scientific work for the institution after he relinquishes his administrative duties.

SEC Reports Odlum Stock Deal

Purchase of 2,300 capital shares of Airfleets, Inc. stock by Floyd B. Odlum, officer, making a total holding of 14,200 shares, is reported in the latest Securities and Exchange survey.

Sherman Fairchild reports transfer of 5,000 common shares of Fairchild Camera and Instrument Corp. stock, total holding, from Sherman Fairchild Associates, Inc., to his own account, making a total holding of 89,824 shares. He also reports transfer of 10,000 common shares of Fairchild Engine and Airplane Corp. stock, total holding, from Sherman Fairchild Associates, Inc., to his own account, making a total holding of 64,570 shares.

Other Fairchild Engine and Airplane

BRITISH PIONEERS HONORED Veteran BOAC Pilot O. P. Jones (left) and Sir Frank Whittle (right) recently were honored by the Royal Aero Club for outstanding work in their respective fields. Jones was awarded the Britannia Trophy for 30 years of service as a pilot "culminating in flying the Queen and Prince Philip across the Atlantic for their Canadian-U. S. tour last year." Sir Frank received the club's Gold Medal of the FAI for his jet engine pioneering. Awards were presented by Lord Brabazon (center), President of the Royal Aero Club.

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Corp. transactions reported are: Floyd S. Bennett, Jr., officer, purchase of 100 common shares, total holding; William Preston Lane, Jr., director, purchase of 400 common shares, total holding; Frank R. Nichols, director, sales of 400 common shares, leaving a total holding of 2,600 shares.

Other transactions reported recently by aviation officials are:

● **Air Associates, Inc.**—Myron B. Gordon, director, purchase of 500 common shares, making a total holding of 1,000 shares, and sale of 500 preferred shares, total holding; Stephen A. McClellan, director, sale of 400 common shares, leaving a total holding of 50 shares, and sale of 500 preferred shares, leaving a total holding of 50 shares.

● **All American Airways** — Charles W. Wendt, officer, sale of 500 common shares, leaving a total holding of 5,500 shares.

● **American Airlines, Inc.**—Silliman Evans, director, sale of 400 common shares, leaving a total holding of 100 shares; William Littlewood, officer, sale of 700 common shares, leaving a total holding of 4,300 shares.

● **Arc Equipment Corp.**—Ralph E. McConnell, director, purchase of 200 common shares, making a total holding of 5,100 shares.

● **Avco Mfg. Corp.**—Joseph B. Hall, director, purchase of 100 common shares, making a total holding of 500 shares; R. S. Pruitt, director, sale of 500 preferred shares, leaving a total holding of 281 shares.

● **Bell Aircraft Corp.**—Roy J. Sandstrom, officer, purchase of 100 common shares, making a total holding of 200 shares.

● **Bendix Aviation Corp.**—Charles Hummel, officer, sale of 100 common shares, leaving a total holding of 100 shares.

● **Boeing Airplane Co.**—Cliff Barron, officer, sale of 100 common share, leaving a total holding of 14 shares.

● **Capital Airlines, Inc.**—Raymond G. Lochiel, officer, exercise of rights to purchase 100 common shares, making a total holding of 2,815 shares; C. Bedell Monro, director, conversion of 4% convertible debentures to 1,125 common shares, total holding.

● **Eastern Air Lines, Inc.**—Stuyvesant Peabody, Jr., director, purchase of 300 common shares, and sale of 100 common shares, making a total holding of 900 shares.

● **Grumman Aircraft Engineering Corp.**—E. Clinton Towl, director, sale of 200 common shares, leaving a total holding of 9,800 shares.

● **Irving Airchute Co., Inc.**—Harley F. Drollinger, director, purchase of 100 common shares, total holding.

● **Lockheed Aircraft Corp.**—D. E. Browne, officer, purchase of 1,400 capital shares, making a total holding of 1,900 shares.

● **Northrop Aircraft Inc.**—John K. Northrop, officer, sale of 100 common shares, leaving a total holding of 3,000 shares.

● **Northwest Airlines, Inc.**—Alonzo Petteys, director, purchase of 200 preferred shares, making a total holding of 1,500 shares.

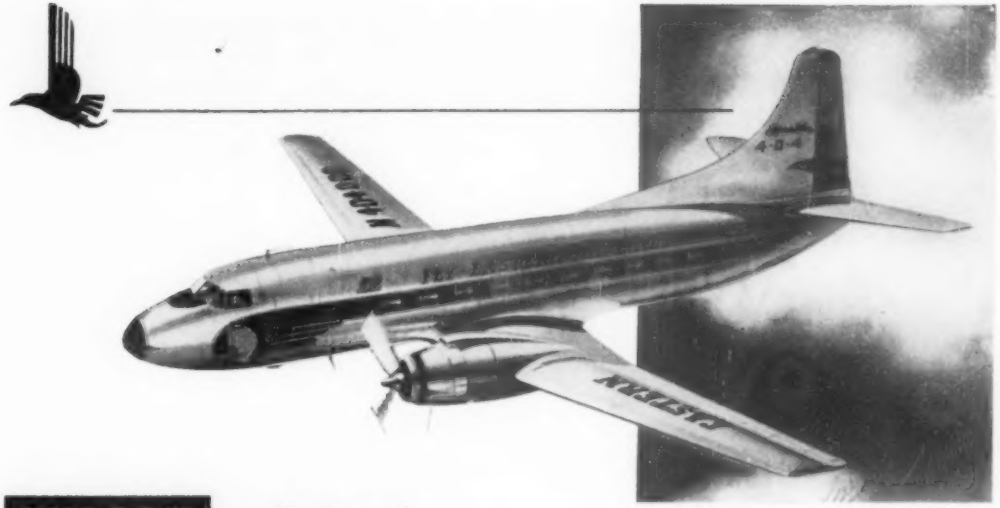
● **Pan American World Airways**—H. M. Bixby, officer, purchase of 30 common shares, making a total holding of 7,500 shares; H. Preston Morris, officer, sale of 125 common shares, leaving a total holding of 1,143 shares.

● **United Aircraft Products**—Edward L. Ladd, officer, purchase of 1,400 common shares, making a total holding of 1,500 shares.

New DATA Chief

UAL Vice President Ray W. Ireland has been named Defense Air Transportation Administrator to succeed Paul Butler, who resigned to return to his job as president of Butler Co. and Butler Aviation, Chicago.

Put Your Scrap Back to Work



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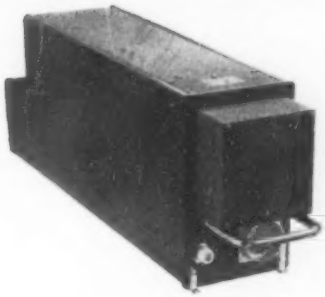

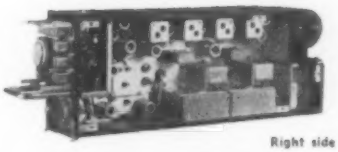

Right side

Left side

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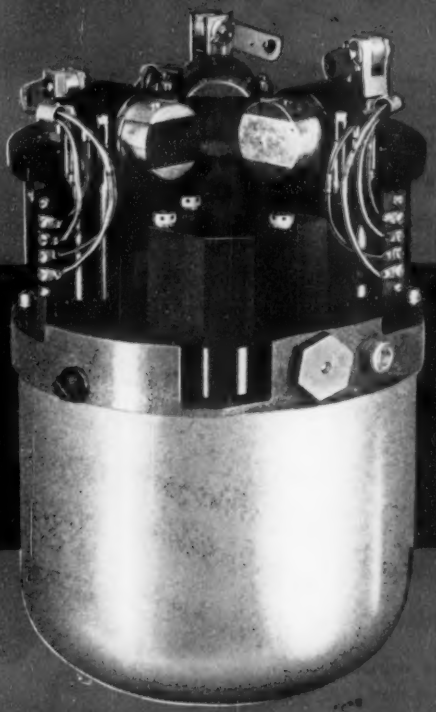

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GYRODYNE 2c helicopter shows changes from earlier version—lengthened fuselage, increased rotor gap and revised landing gear.

Gyrodyne Model 2c Starts Test Flights

- **New copter solves many coaxial rotor problems.**
- **But company sets sights on convertiplanes.**

By David A. Anderton

Flowerfield, St. James, L. I.—The Gyrodyne Model 2c coaxial copter has entered the first phase of its evaluation flight tests for the Defense Dept.

Successful completion of these tests by the craft will mark first step toward eventual use of the configuration on convertiplane designs now on company drawing boards.

And Peter J. Papadakos, president of the Gyrodyne Company of America, Inc., looks to limited production of the 2c design as the next step in the company's planning for the future.

HELIDYNE, experimental prototype convertiplane, shown in forward flight.

▶**Evaluation Contract**—The Defense Dept. contracted in June, 1951, with Gyrodyne to flight-test the coaxial configuration. In addition to flying the craft, the contract called for some rework of the original configuration of a flying testbed for the rotor system. This testbed was the GCA Coaxial Helicopter, the development of a layout that started some years before with the ideas of Vincent Bendix.

Gyrodyne, which was organized in 1946, bought in 1949 the assets of Helicopters, Inc. which had been Bendix Helicopters, Inc. The company acquired the basic airframe which has since been flown both as helicopter and convertiplane.

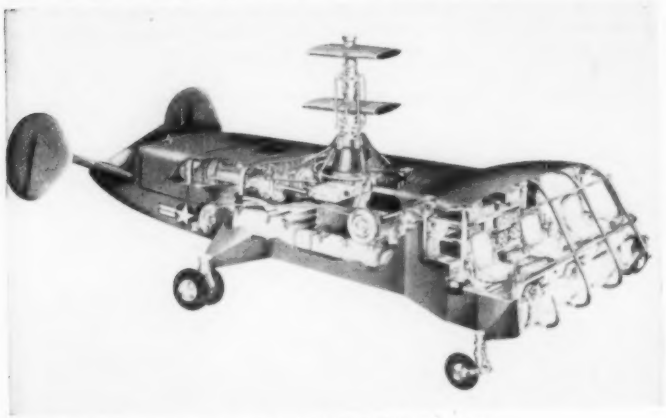
Since its earlier days, the Gyrodyne 2c has been through some changes which have greatly improved the craft. Rotor gap has been increased; fuselage was lengthened by a 30-in. splice in its center section. The transmission mounting has been improved and hydraulic boosts have been added to the blade control system.

As a result, the 2c is almost a new aircraft.

The craft first flew on Apr. 11, 1952, in its new guise. On that day, company test pilot Jim Ryan put in just short of an hour in the air. It flew again the following day, and the day after that. Then it went back into the shop for minor "crab" corrections, and is now flying again.

▶**Design Reasons**—Gyrodyne's 2c is an eye-catcher from the top of its black coaxial rotors to the bottom of its

Co-axial Rotor Presents Possibilities . . .



MODEL 21 is cargo design proposal with Allison T40 turboprop.

CARGO POD for Model 21 is detachable, can be loaded while craft hovers.

TRANSPORT design for 18 passengers carries over Helidyne convertiplane scheme.

bright orange fuselage. It looks right.

But its beauty is more than skin-deep; the coaxial configuration has some basic advantages over all other types.

Take size, for example. Maximum dimension on the coaxial layout is the rotor diameter. Such a copter requires minimum operating space, and takes about half the stowage area required by other copters of equivalent capacity.

There is a power saving in the coaxial type. All the engine power goes directly to the rotors; none is required for anti-torque purposes.

There are disadvantages sometimes attributed to the configuration—these center on the rotor. One text on helicopter aerodynamics says that the coaxial copter has more complex hubs and controls, and rotors weigh more.

But a careful study of the way power is transmitted from engine to rotor in the 2c and the manner of pitch control dispels any feeling of disadvantage from the coaxial layout.

▶ **Rotor Details**—Two sets of tapered, untwisted blades are rigidly connected and mounted on the rotor mast. There is one blade hinge, a see-saw type, for each pair of blades. Rotor disc diameter is 48 ft., and the gap between discs is 9% of that figure, or 4.3 ft.

At the bottom of the rotor mast is the transmission, shock-mounted to reduce vibration. There are only five gears—all spiral-bevel—in this transmission. The drive shaft is coupled to a universal joint between engine and transmission; at its transmission end is a worm gear which drives a larger gear. This second gear has a short shaft to a pinion gear at the other end. This pinion drives two gears—mounted on concentric shafts—in opposite directions. These counter-rotating shafts are the shafts for the rotor head.

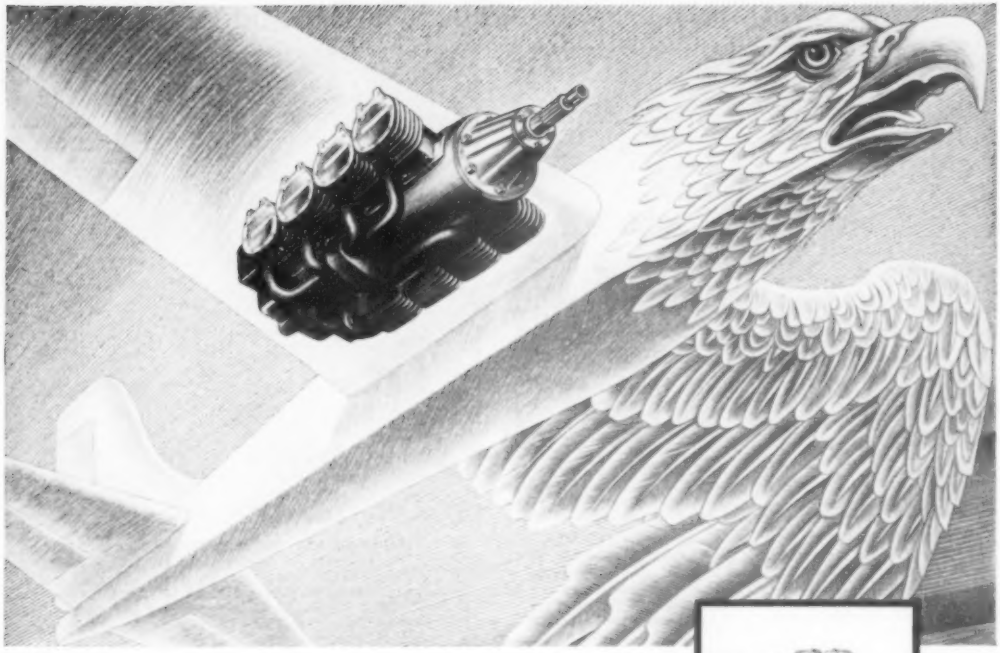
▶ **Fuselage Layout**—The engine—a Pratt & Whitney R985, rated at 450 hp. from sea level to 2,300 ft.—is carried in a box structure which is the heart of the fuselage.

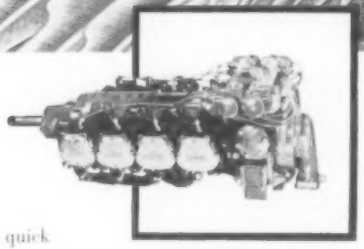
Visualize a box without top and bottom whose length is about twice its width. Imagine a divider across the middle of the long side. Then add a top between the divider and one end. That roughly is the basic fuselage structure of the Gyrodyne.

For orientation, the open portion of the box is the extreme rear section of the fuselage, and carries the engine. The topped portion is the rear floor of the cabin.

A ring bulkhead structure rises from the divider and acts as firewall between engine and fuselage interior. From the front face of the box, two beams cantilever forward. Between these beams, about half-way to the front, there is a second box-beam structure. This is the main support for forward landing gear.

All the fuselage frames are tied in to





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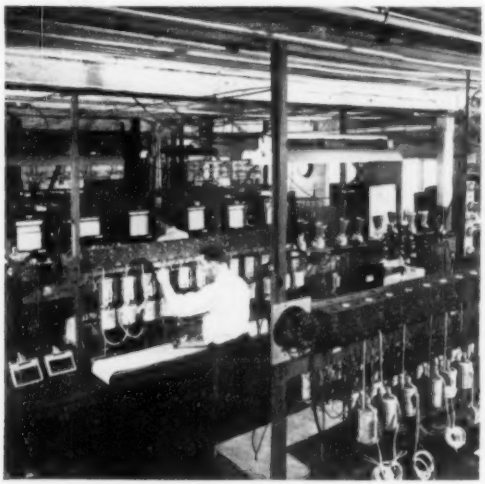

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Gyrodyne Model 2c (5-place)

Rotor disc diameter	48 ft.
Gross weight	5,400 lb.
Empty weight	3,800 lb.
Useful load	1,600 lb.
Fuselage length	18 ft.
Width at landing gear	12 ft.
Overall height	14 ft. 2 in.
Hovering ceiling (in ground effect)	11,000 ft.
Hovering ceiling (no ground effect)	5,900 ft.
Vertical rate of climb	625 fpm.
Autorotative rate of descent	38 fps.
Max. speed, sea level	87 knots
Cruising speed, 75% power	74 knots

the basic structure in the conventional manner. The fuselage is actually built on the keel principle, although the keel is of varying cross-section and of both open and closed structure.

▶**Fuselage Details**—With the powerplant submerged at the rear of the fuselage, engine accessibility depends on a quick-disconnect. The Gyrodyne designers chose to break the fuselage along an inclined line determined by the forward-slanting bulkhead which carries a set of engine mounts.

There are four bolts at the break line; these, the control cables and the electrical lines to the tail section are the only connections which must be broken.

With the fuselage rear section off, the engine compartment is open for work. Overall height of the Gyrodyne is low enough so that most work on the engine section can be done from the ground. To work at the transmission, or to reach across the engine, the mechanic needs some elevation.

The oil tank and oil cooler are on the aft face of the inclined bulkhead at the break. Forward of the bulkhead and below it is the fuel tank, with a capacity of 100 gal. Engine exhaust stacks protrude through holes in the bulkhead and project out and aft into the airstream along the fuselage sides.

▶**Nose and Cockpit**—You get into the fuselage through two large doors, one on each side over the forward landing gear. Pilot and co-pilot positions are roomy and well-planned. The current Gyrodyne has no further seating inside, but the fuselage has plenty of space remaining for four passenger seats.

Although the windshield is well forward of the flying positions, there is no feeling of "tunneled" visibility. Because of the T-shaped instrument layout, it should be possible to add extra glass areas on the lower forward fuselage section. This will probably be done after the flight test evaluation has been made.

Landing gear is four-wheeled. The

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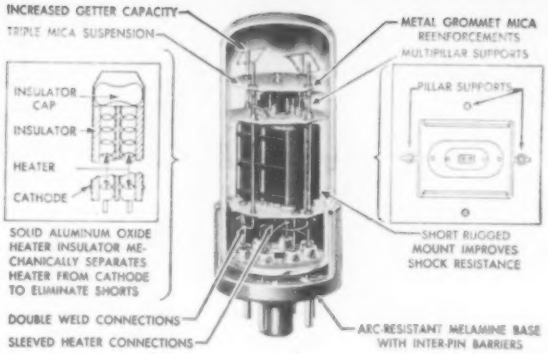

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Heater current	0.6 amps
Plate voltage—(max.)	300 volts
Screen voltage—(max.)	275 volts
Plate dissipation—(max.)	10 watts
Screen dissipation—(max.)	2 watts
Max. heater-cathode voltage	300 volts
Max. grid resistance	0.1 megohms
Warm-up time	45 sec.

(Plate and heater voltage may be applied simultaneously)

TYPICAL OPERATION

Single-Tube, Class A_1 Amplifier

Plate voltage	250 volts
Screen voltage	250 volts
Grid voltage	−12.5 volts
Peak A-F grid voltage	12.5 volts
Zero signal plate current	45 ma
Max. signal plate current	47 ma
Zero signal screen current	4.5 ma
Max. signal screen current	7.0 ma
Plate resistance	45,000 ohms
Transconductance	4,000 μmhos
Load resistance	5,000 ohms
Total harmonic distortion	8%
Max. signal power output	4.0 watts

PHYSICAL CHARACTERISTICS

Base	Intermediate shell octal 8-pin
Bulb	T-9
Max. overall length	3¼ in.
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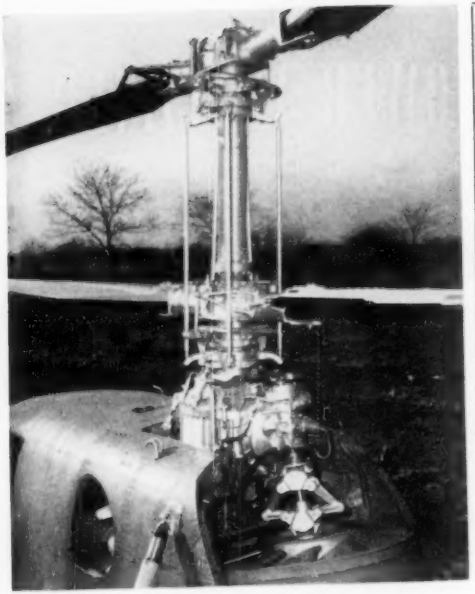

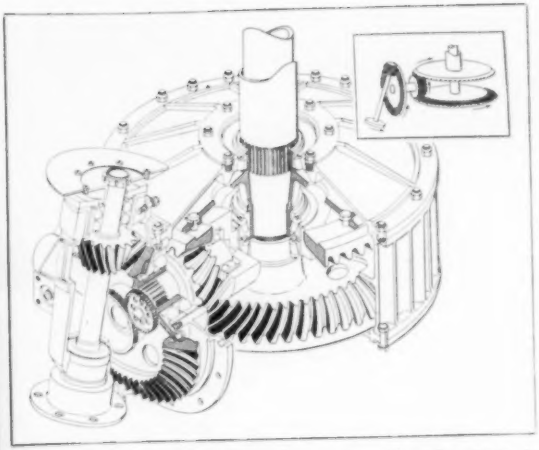

ABOVE. Five gears, all spiral-bevel type, transmit engine power to coaxial rotors of Gyrodyne 2c, which turn in opposite directions. Entire transmission is shock-mounted to reduce vibration.

LEFT. Rotor head has minimum number of parts. Engine drive shaft (lower right) couples through universal joint to transmission. Blade pitch control linkage is slip-ring and pushrod type.

two main wheels are strut-mounted to the sides of the inclined firewall; main gear has a large tread. The forward gear ties into the cantilever structure of the fuselage box, and has castoring-type wheels.

▶**Tail Cone**—Structure of the removable tail section is conventional ring-and-stringer combination. Because of the small loads to be carried, metal gages are minimized. Surface controls—comprising ground-adjustable stabilizer, and flight-operable elevators and rudders—are all-metal. They serve to add stability and control in the convertiplane flight phases.

Access to the various services and instruments is through removable panels in nose, fuselage nose and belly. The main electrical junction box is on the right hand side of the fuselage, below and behind the door sill.

There's one overall impression you get of the Gyrodyne, after you get used to the idea of seeing two rotors where every other helicopter wears only one. That impression is one of extreme good looks. The Gyrodyne is a handsome aircraft.

There's an old saying in the aircraft design business: "If it looks right, it'll fly right." Apparently the Gyrodyne does fly right; but even so it has a tough haul ahead of it. Almost every other copter manufacturer has gone to the single-rotor plus tail rotor, or the tandem rotor layout. With all the 2c's cited advantages, it still remains a different kind of helicopter. That fact alone will make it difficult for some people to accept.

▶**Future Hopes**—The Gyrodyne people hope that after the 2c clears its flight test hurdles, the Navy will give the firm a small-quantity service contract. That is the kind of job that Gyrodyne could handle nicely, because the entire shop and supporting operation is geared to a quantity of about a half-dozen or so aircraft.

But Papadakos is looking to the convertiplane as the future volume business for his firm. The Model 2c, in an earlier form, was flown with two engine-propeller combinations on outriggers. It was an unsophisticated rig, but it was a sort of convertiplane and it proved the layout.

That same basic scheme has been used as the foundation for a group of design proposals for convertiplanes. They all feature engines mounted outboard of the fuselage on stub wings which serve as auxiliary lifting surfaces as the flight speed increases.

Such a design scheme should solve some of the problems inherent in the convertiplane.

▶**Transition Flight**—What happens between the time the convertiplane is hovering and the time it goes into level flight? How do you handle the rotors during transition flight?

With Gyrodyne's proposed layouts, all you do is make some pitch changes and open the throttles of the outboard engines. There is a slight change in trim—the aircraft shows very little of the nose-dropping common to other helicopters in their transition from hovering to straight flight—and you are flying straight and level.

As you pick up speed, you do have to consider the rotors. Papadakos says that he proposes to attack the problem on the basis of the design speed range of the craft.

If top speed is going to be somewhere around 200 mph., it is all right to let the rotors autorotate. As the speed increases, the telescoping rotor seems to be the answer. You pull in the rotor disc to a smaller diameter and drive the rotors with enough power to reduce their drag to zero.

In the range from 275 mph. to about 400 mph., the solution seems to be to telescope the rotors and stop them. Gyrodyne proposals call for them to be locked in a fore-and-aft position.

▶**Cargo Carrier**—Gyrodyne has not neglected the straight helicopter application of the coaxial rotors; one of the most intriguing of their proposals is a huge cargo-carrying copter.

This Model 21, as it is designated, carries the cargo in a detachable pod; hoisting and attaching of the cargo pod may be done while the Model 21 is hovering.

For some indication of size, Gyrodyne quotes a maximum overload takeoff gross of 52,500 lb. The cargo weight is 28,000 lb. With this load, the range is 360 nautical miles.

Power to drive the 100-ft. diameter rotors comes from an Allison T40 turboprop engine.

But the Model 21, and other proposals, must wait on the successful completion of the current flight test program. Gyrodyne has no plans for overnight mushrooming; the company

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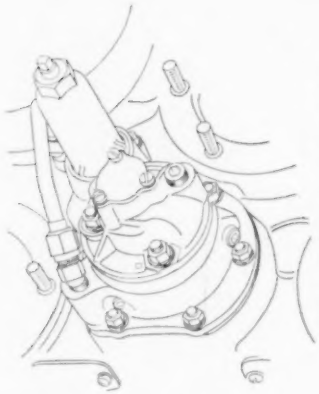

PROBLEM: In the manufacture of products such as this aircraft engine accessory drive, ability to withstand vibration is obviously a necessity. Lock washers proved unsatisfactory because they frequently scored carefully finished seating surfaces and their two-piece installation consumed extra time. Alternate devices, such as safety-wired castellated nuts and cap screws, involved tedious and costly installation practices. And, because dependable protection against the loosening effects of extreme vibration was not assured, manufacturers asked for a more positive locking device.

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sees an orderly growth in the future.

► **Archetype Shop**—Currently about 60 employes contribute to the Model 2c effort. The factory area—24,000 sq. ft. —looks like a model shop. There is just about one of everything needed to build small quantities of rotorcraft, including machine tools, metal-working equipment, stock rooms and the like. Supporting departments—dark room, blueprinting, woodworking—have been set up.

Gyrodyne has a core around which to expand. There is space at Flowerfield for eventual growth, and there is, say the company executives, enough labor in the area to support that growth. They are enthusiastic about the coaxial configuration and their feelings are backed up by the tangible evidence of a respectable amount of flight time.

Convair to Develop Titanium Alloy Use

Jet pod parts may be the first aircraft use of titanium alloy as the result of a contract awarded to Consolidated Vultee Aircraft Corp. by the Air Force.

It is significant that titanium alloy has been specified, because most of the previous contracts have been for studies of the pure metal. Convair's contract is believed to be one of the first awarded to an aircraft manufacturer for the developing of alloy uses.

Titanium currently sells for $22.50 per pound commercially. It is as strong as steel and about 60% as heavy for equivalent strength. High-temperature properties of titanium are excellent up to about 1,000F.

It is extremely difficult to refine; the process has to be done under a vacuum, which partially explains the cost. But with the government subsidizing the manufacture of titanium alloy, there are hopes that improved processes will increase availability and lower the cost.

Ceramics Research Efforts Pooled

Ceramic coating research for high temperature applications has received added impetus with signing of an agreement between Ryan Aeronautical Co. and California Metal Enameling Co. to carry out a jointly financed program in this field.

At the same time, both companies revealed that their improved ceramic A-418-Ryanco-C, is designed to operate under continuous temperature of 1,800F and remains unaffected by thermal shocks encountered in exhaust systems between −70F and 1,700F.

Both companies' laboratories have been collaborating on ceramic coating research since early 1950.

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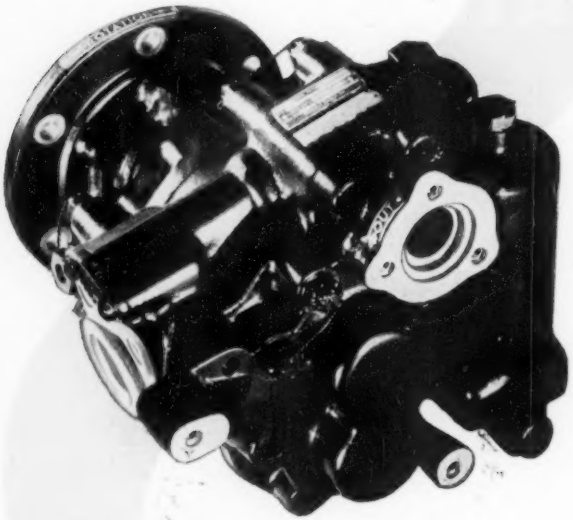
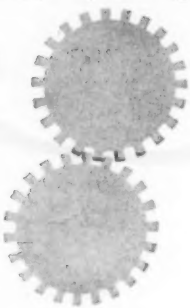


THOMPSON GEAR PUMPS



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Gemeaux IV Flies With Aspin I Ducted Fan

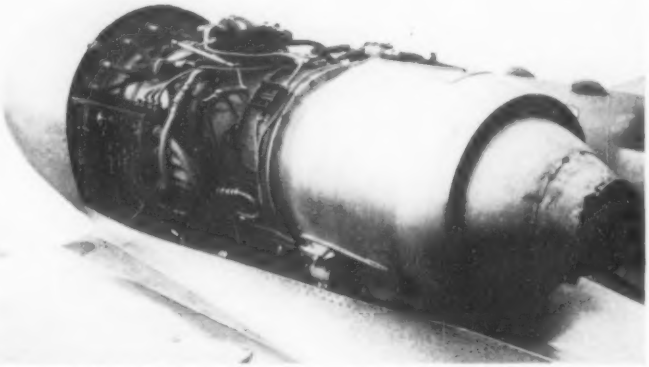
The Gemeaux IV, one of a series of French flight test aircraft developed from a sailplane airframe, made its first flight recently, powered by a Turbomeca Aspin I ducted fan.

Gemeaux is manufactured by Etablissements Fouga & Cie., of Aire-sur-l'Adour, France. Pilot for the first flight was Leon Bourrican.

► **Aspin Basic**—The ducted fan is basically a short-bladed propeller operating in an annular duct. Power to drive the prop comes from a turbine which is the aft rotating component of a standard turbojet configuration. Air for the turbojet is bled from the same annular duct in which the propeller operates. Thus there are two concentric discharge areas; the inner one is the turbojet discharge and the outer one handles the air which has received its energy from the propeller.

Flight tests of the engine are aimed at assessing installational advantages of the ducted fan; bench running on the Aspin currently totals over 1,000 hr.

Gemeaux IV weighs in at 2,640 lb. with a useful load of 880 lb. Wingspan is 35.3 ft., length 21.7 ft., and wing area is about 135 sq. ft.



Aspin I is about 20 in. diameter, weighs about 310 lb. and has a thrust of 440 lb. Specific fuel consumption is given as 0.6 lb./lb./hr.

Fouga is proceeding with Gemeaux V which is to be powered by the more-powerful Aspin II, rated at about 800-lb. thrust.

The Aspin is one of a series of Turbomeca engines which Continental Motors Corp. will build in the U. S.

THRUST & DRAG

The more you think about guided missiles, the more you tend to philosophize about them. That's probably because so many of them are still in the dream stage and therefore intangible. Reason and logic seem to be the correct approaches rather than calculation and test.

And when you look at the picture that way, you begin to see the appalling size of the economy required to support these future engines of war. There used to be a time when the proponents of the guided missile argued that one main advantage was the low cost—in quantity, these things could be made very cheaply.

But time has not proved this argument. Instead, the new techniques of manufacture, the new materials and fuels, the new avionic brains required have begun to point up the fact that the missile is a very expensive gadget, indeed. In fact, the missile is getting to be so expensive that we can not think of an overwhelming mass assault with missiles any more than we can consider the same thing with super-bombers. The industrial support, the logistics, the probable losses to enemy action combine to make the repeated cost of such an offensive more than we can consider.

This leads to the conclusion that the guided missile is best employed as a weapon against specific targets that can't be reached in any other way. Individual rounds, each with a high kill probability, will be fired against a carefully chosen and located target. There should be no mass salvoing of hundreds of guided weapons from launching sites placed chock-a-block in an area.

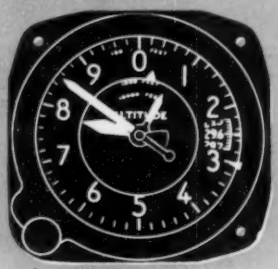
When you begin to consider what is a worthwhile target, you begin to see the crude outlines of the ultimate guided missile. The types we consider now—anti-aircraft, anti-submarine, tactical bombers—are simply interim weapons. They hit the enemy; they shoot down his attacking planes, destroy his undersea craft, kill his troops. But as long as there are more planes, subs and troops, these missiles do not change the tide of warfare, except locally.

This gets back to the arguments in favor of strategic bombing. Destroy the enemy's heartland, and you knock him out of the war.

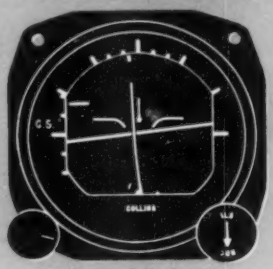
The enemy's heartland is made up of the geographical areas that support his war. It is made up of his farmland, his factory cities, his railheads and major ports. It includes his fuel storage areas, and his hydro-electric plants.

Knocking out the German and Japanese heartland during World War II was done with a variety of weapons—in-

precise ILS approach flying

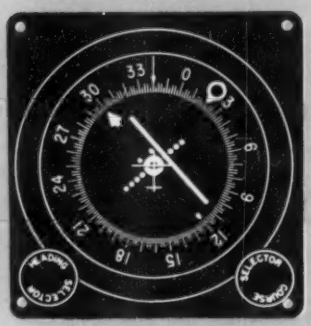


Altimeter



Approach Horizon

Air Speed Indicator



Course Indicator

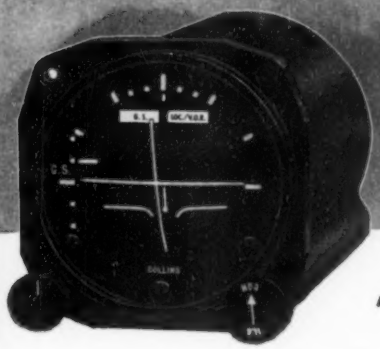
COLLINS Radio Company is now giving demonstrations of a revolutionary new Flight Instrument System to airline pilots and technical personnel from coast to coast.

The purpose of the System, which has been under development and flight test for many months, is to give the pilot a clear *pictorial* presentation, on fewer instruments, of all the information he needs for precise ILS approach flying and en route navigation. Only four instruments are required in the basic flight group diagrammed above . . . the new Collins Approach Horizon, the Course Indicator, conventional altimeter and conventional air speed indicator.

Although complete VHF navigation and instrument letdown information is supplied the pilot on only two instruments, there is no possible source of confusion. Rather, there is a quicker, easier perception of the aircraft's exact position with respect to the selected course, and easily followed steering directions for making good the course.

The Approach Horizon, in addition to showing attitude, is an "anticipator" instrument. It tells the pilot (1) he is steering the plane correctly or incorrectly to arrive smoothly on course, or (2) he is on course and steering correctly, or (3) he is on course but flying in a manner that won't keep him there. Thus on final approach this single instrument presents all information necessary for making an accurate ILS letdown without bracketing the localizer course or maneuvering violently to get on the runway after break-through.

ng greatly simplified!



Collins
Approach Horizon

Collins
Course Indicator

The horizontal bar of the Approach Horizon operates much the same as a standard artificial horizon. Pitch information is shown by the stylized wings and fin of the airplane in the center of the instrument, which move up or down as the attitude of the aircraft is changed.

Displacement information with respect to the glideslope is obtained by noting the position of the pointer on the left in relation to the G. S. scale.

Electronically computed steering information for making good the localizer course is presented to the pilot by left or right deflection of the vertical pointer. To make good the course it is only necessary for the pilot to maneuver the airplane to keep the pointer centered. Drift is automatically compensated for by forcing the pilot to "crab" in order to keep the pointer centered.

The Approach Horizon may also be used to good advantage in flying compass headings.

The Course Indicator provides the pilot with a clear picture of his position with respect to his chosen course, just as though he could see his course as a broad white line marked on the ground below.

This single instrument presents to the pilot at a glance all the information which ordinarily must be assimilated by evaluating the readings of several other instruments, which the Course Indicator makes unnecessary.

The aircraft's compass heading is displayed continuously against the lubber line at the top of the instrument.

Displacement information with respect to a selected omnirange or localizer course is shown by the relative position of the small white airplane to the broad white bar which represents the course.

To-From information with respect to an omnirange station appears as small white flags on the appropriate side of the indicator center.

Thus, the Collins Flight Instrument System displays on these two instruments alone all necessary information for precise ILS approach flying: attitude, position and steering instruction.

Adoption of the Collins Flight Instrument System will replace two of the instruments in the conventional flight panel and eliminate several others. This simplification of the panel reduces expense and maintenance, of course, but more important, presents to the pilot all the necessary information, more clearly, on fewer instruments, and in a manner that requires a minimum of interpretation.

A booklet illustrating and describing the operation of the Collins Flight System is now available. We will be glad to mail you a copy on request.

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endiaries, high-explosives, fragmentation bombs, ship- and land-based artillery and the atomic bomb.

The ultimate guided missile is a single-purpose weapon which can be effective against any one of these targets in any weather. It must be able to devastate the area completely, smashing factory, foundation and subsoil into rubble.

And the way it looks now, this ultimate missile is a long-range, rocket-powered craft which carries a small atomic warhead. At the target, it drives deep into the earth and explodes. The resulting man-made earthquake destroys the area as completely as Genghis Khan's men did Asiatic cities.

Such a missile using current fuels would probably have three stages to get the necessary velocity which means distance. It might not have to have pin-point accuracy, because the area of destruction could be large enough to allow a reasonable navigational error. It would cost lots of money to build, set up and launch.

It might—at the firing stand and ready to go—represent as much as $5 million per copy. But in a variety of ways would return that initial investment many fold.

This seems to be the ultimate guided missile.—DAA

Plan Seminar In Aeroelasticity

A special review course in recent developments in aeroelasticity is scheduled for July 14-22 at the Massachusetts Institute of Technology. Program will be directed by Prof. R. L. Bisplinghoff who is in charge of aeroelastic and structures research at MIT.

The review is slanted toward the aeroelastician and the engineer in a related field.

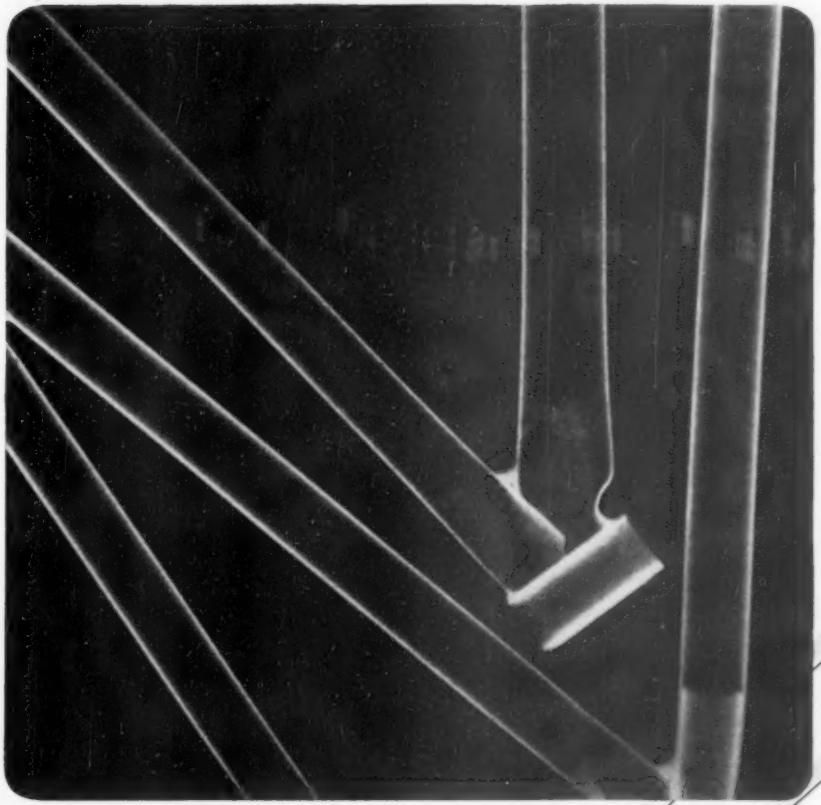
The course will include an introduction, consideration of aerodynamic tools for working on the problems, theoretical solutions of practical problems and the use of dynamic models and windtunnel testing.

Living accommodations will be available for those requesting them in application for the course. Address Dr. Ernest H. Huntress, Director of the Summer Session, Room 3-107, Massachusetts Institute of Technology, Cambridge 39, Mass.

Jet Cooling System Wins Company Check

The invention of a gas-turbine combustor featuring air cooling of the inner combustor wall brought a $5,000 check and special recognition recently to Ernest F. Miller, veteran Steam di-

Radiography checks—



then double checks

LANDING GEAR STRUTS lead a life of punishment. Though light, they must be strong. Their joints must be sound. Radiography is the method used to prove them sound.

A maker of amphibian aircraft goes even further. Though treated and sealed, strut members can develop internal corrosion and become weakened. Radiography alone can provide the required nondestructive examination of these internal surfaces. So it has become routine to x-ray these struts as part of the periodic inspection of the planes.

This is but one example of how radiography is proving a boon to the welding process. It is helping to open new fields for the use of welding—especially in the fabrication of highly stressed products and assemblies.

Look into the ways Radiography can aid your business. Your x-ray dealer will be glad to give you full information and assistance.

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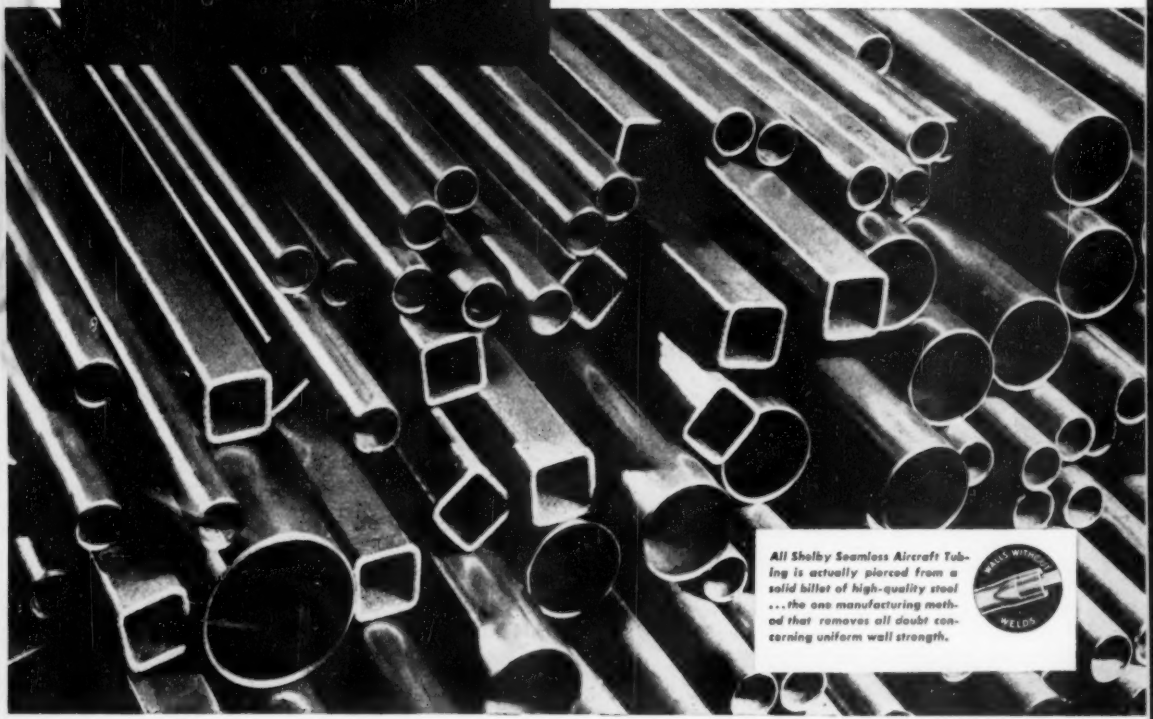

All Shelby Seamless Aircraft Tubing is actually pierced from a solid billet of high-quality steel . . . the one manufacturing method that removes all doubt concerning uniform wall strength.

U·S·S SHELBY SEAMLESS Aircraft Tubing

UNITED STATES STEEL

vision engineer of the Westinghouse Electric Corp.

In a brief presentation ceremony, Mr. Gwilym A. Price, president of Westinghouse, said that the ". . . invention has so far been used in several million dollars worth of jet engines that have been delivered to our armed forces. We expect it to go into over $100 million worth of jet engines every year. . . ."

The description of Miller's invention says that the combustor is made of telescoping circular sections that allow relatively cool air to wipe the inner surface of the combustor wall.

NACA Reports

▶ **Theoretical Force and Moments Due to Sideslip of a Number of Vertical Tail Configurations at Supersonic Speeds (TN 2412)—By John C. Martin and Frank S. Malvestuto, Jr.**

Supersonic flight of research airplanes, such as the Douglas D-558-2 Skyrocket, has pointed up the seriousness of the dynamic stability problem. Theoretical analyses of the problem have too often lagged flight test of the aircraft. For instance, information is lacking on the stability derivatives contributed by the vertical tail.

This paper reports a theoretical analysis to determine lateral force, yawing moment, and rolling moment due to sideslip for a series of tail configurations. These tails are characterized by supersonic leading edges. They consist of vertical surface mounted symmetrically on a horizontal tail; the vertical-tail plan form may be either triangular, rectangular, or of sweptback configuration.

Linearized theory is used to evaluate the derivatives; therefore, only first approximations are obtained. Results are restricted to cases where the leading edges are supersonic, and the Mach line from the tip of the leading edge of the vertical tail does not intersect the root section. Influence of the wing on these tail derivatives has not been considered.

And the authors note that restriction of the linearized flow theory limits the suitability of the results for full-scale flight stability calculations. It appears that theory still lags flight tests.

▶ **The Similarity Law for Hypersonic Flow About Slender Three-Dimensional Shapes (TN 2443)—By Frank M. Hamaker, Stanford E. Neice, and A. J. Eggers, Jr.**

This report is a further study of the hypersonic similarity laws first developed by Tsien in late 1946. Tsien's development was for thin air-foil sections

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This photo shows a Seal Cap application as incorporated in Convair's standard sealing procedures for the new B-36.

BRUSH BUILD-UP METHOD

Performance disadvantages in this procedure are: (1) Thinness of coating at fastener corners invites rupture. (2) excessive flow-out at base adds unnecessary sealant weight. (3) workmanship errors may leave voids or, in some cases, completely skip areas in inaccessible locations.

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and slender non-lifting bodies of revolution.

Further extensions and applications of the similarity law have been made in the past. But the NACA thought it would be desirable to determine the form of the law for slender three-dimensional bodies of arbitrary shapes. And, of course, this development would be in terms of the customary aero dynamic parameters. The types of shapes included were wings, bodies and wing-body combinations.

It was possible to get a limited experimental check for bodies of revolution by comparing pressures measured on two inclined cones in related flows. For these special cases, theory and experiment were in good agreement except on the lee side of the cone.

The authors suggest that the range of applicability of the law appears to warrant further investigation. They feel that if this range is relatively as wide as the corresponding range for non-inclined bodies of revolution, then the law should prove of value to correlate experimental data. And it should be possible to simplify further theoretical calculations of the areodynamic characteristics for families of these particular shapes.

►Analytical Method for Determining Performance of Turbojet-Engine Tail-Pipe Heat Exchangers (TN 2456)—By Michael Behun and Harrison C. Chandler, Jr.

The use of a tail-pipe heat exchanger offers some interesting possibilities as a source of heat for thermal anti-icing systems of turbojet aircraft. Such a heat exchanger consists of a shroud surrounding the tail pipe of a turbojet engine; it has no resistance to the flow of gases through the tail-pipe. Therefore, this heat exchanger appears to be the least harmful method of extracting energy from a turbojet engine.

This particular investigation is part of the NACA's general study of the effects of extracting energy from several points in the turbojet engine cycle. The method presented can be used to calculate performance of an unfinned tail-pipe heat exchanger of the parallel-flow type. Results are presented in the form of generalized working charts for a wide range of flight conditions.

One specific example, calculated for a 6-ft. long heat exchanger on a turbojet engine without after-burning, showed a heat output of about 780,000 Btu. per hour. This heat output was obtained with an engine performance reduction in net thrust on the order of 2%.

Comparing the performance of finned and unfinned heat exchangers indicates that the unfinned parallel-flow type is probably preferable. This is because of its lighter weight and simpler construction. —DAA

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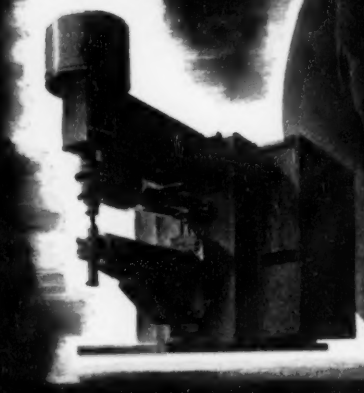

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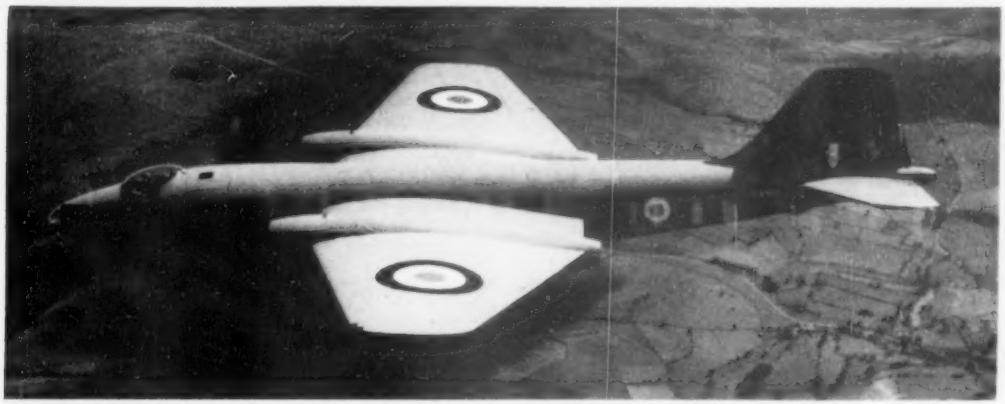


CANBERRA LIGHT BOMBER, with two squadrons in service, is one of the six or seven planes Royal Air Force is stressing.

British Bank on 'Super-Priority' Plan

This gives certain aircraft types top position in UK economy, but observers wonder if it will really work.

By Nat McKitterick

(*McGraw-Hill World News*)

London—Contractors and subcontractors for six or seven of Britain's newest aircraft will get first call over everybody—exports, other defense needs, and home production—for materials, machines, labor, and even houses for new labor, in order to get Britain's aircraft production program off the ground.

▶ **Super-Priority**—This is how the Ministry of Supply has defined "super-priority" which Prime Minister Churchill has allotted to the needs of the RAF. Aircraft eligible include the Hawker Hunter (P.1067), the Vickers Supermarine Swift, the Vickers Valiant, the Fairey Gannet, the English Electric Canberra and "the all-weather fighter." This last refers either to the Gloster deltawing GA 5 or the de Havilland DH 110—or to both. The RAF has yet to decide which one it wants.

Of the planes on the super-priority list, only the Canberra is actually in production—and that in only one of four factories slated to produce the sleek light bomber. All the other production lines are still in the early tooling-up stage. By keeping the list of items eligible for super-priority small, MoS hopes the device will really have some effect. The list also includes aircraft ammunition, some specified electronic equipment, and guided missiles.

▶ **Hopes Tempered**—But hopes are tempered by the hard facts of machine tool shortages, shortages of skilled labor, and design troubles. Except the Canberra, two squadrons of which are already in service, none of the other craft are likely to be in service in any numbers before early 1955. MoS admitted as much when it discussed the aircraft industry's labor needs. Said MoS, the industry needs 75,000 more workers—but chances are they can't all be employed before early 1955.

One thing even super-priority isn't going to do much about is the lack of a few key machine tools, ordered in the U. S. in 1951, which MoS says threaten to hold up the program all along the line.

Example: Three specially designed Cincinnati Hydrotels are currently needed urgently to get Canberra production started at the three major subcontracting factories—Short Bros., Handley-Page, and A. V. Roe, Ltd. There are other examples involving Blanchards, jig borers, vertical borers, and turret lathes.

The Hydrotels, most serious bottleneck, aren't likely to be gotten soon. Cincinnati is building the tool specially for the British. During the early part of this month Mutual Security Agency was to appeal to the National Production Authority for diversion of some of the other tools—some from USAF stocks—to help the British get started.

The British aren't very hopeful of getting quicker delivery dates from the U. S., W. G. Puckey, head of MoS' aircraft production division, told AVIATION WEEK, "If we are going to wait for U. S. delivery dates, we won't ever get our program going even with super-priority." Puckey figures that the key tools involved made up only about 10% of the $112-million worth of tool orders Britain has placed in the U. S. But only a tenth of this 10% has been delivered.

Puckey urged the British industry to look for alternative methods to solve machine shop bottlenecks, even if they entailed "considerably more expense." He urged manufacturers lucky enough to have the urgently needed tools to work them 140 hours a week or more.

▶ **Long Leads**—Delivery dates for aircraft in Britain have been lengthening out dangerously and the best bet is that super-priority will at least stop the trend. In a report to a House of Commons committee recently, MoS figured it now takes 23 to 29 months to get a new type of aircraft into service here. Last year it was 21 months to two years. Getting delivery of types now in production takes anywhere from 21 months to two years as against an average of 16 months last year. At this rate there is a very serious danger that the fine new stable of British fighters may be well on the way to obsolescence before they get into service.

▶ **All-Weather Go-Ahead**—The inclusion of the "all-weather fighter" in the super-priority list points up a recent change in Air Ministry plans. Up until several weeks ago, only a half-dozen or so GA 5s and DH 110s were

to be ordered. The RAF wanted prolonged comparison tests before deciding whether or not the twin-jet delta or the sweptwing de Havilland craft was best.

Now the top command has decided the RAF's current candidates for all-weather fighter—the Armstrong Whitworth N.F. 11 and the Vampire N.F. 10—are dangerously inadequate.

One indication: it takes about seven minutes for the two types now in service to climb to 35,000 ft. Last summer a Meteor, powered by two Armstrong Siddeley Sapphire engines set a world's record climbing to 39,370 ft. in 3 min. 9.5 sec. The two new all-weather fighters will be powered with two Rolls-Royce Avons each—an engine probably more powerful than existing Sapphires.

Significantly lacking from the super-priority list is any mention of the DH Venom or the Hawker Sea Hawk, the two most important aircraft coming into service for the first time this year.

The super-priority list makes up about one-sixth of Britain's current rearmament effort. Total spending on aircraft production this year will be about $310 million, up $84 million from last year.

USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command.

- **Aircooled Motors, Inc.**, Syracuse, miscellaneous spares, $50,000.
- **American Meter Co.**, Erie, Pa., transmitters, $65,898.
- **Balmar Corp.**, Baltimore, stabilizer skins, $35,000.
- **Bendix Products div.**, Bendix Aviation Corp., South Bend, spare parts, $42,758; wheel assemblies, $171,094.
- **Beseler, Chas.**, 60 Badger Ave., Newark, spare parts, $42,279.
- **Cine Products Supply Co.**, Evesham Ave., Ashland, N. J., photo equipment, $109,312.
- **Dana Corp.**, 4100 Bennett Rd., Toledo, spare parts, $28,828.
- **DeWalt Inc.**, Lancaster, sawing machines, 54 ea., $34,506.
- **Eclipse Pioneer div.**, Bendix Aviation Corp., Teterboro, automatic pilot, $4,575,000; spare parts, $50,865.
- **Edison, Thomas A., Inc.**, West Orange, N. J., panel assembly, 200 ea., $30,470.
- **Flex-O-Tube**, Meridan Corp., Detroit, hose assembly, $71,234.
- **Garrett, George K., Co.**, D & Tioga Sts., Philadelphia, aircraft hardware, $704,220.
- **General Motors Corp.**, Saginaw Steering Gear div., Detroit, machinery & equipment, $170,640.
- **Gibbs Mfg. & Research Corp.**, Janesville, Wis., spare parts, 10 ea., $174,664.
- **Goodrich, B. F., Co.**, 500 S. Main St., Akron, wheel assemblies, $194,957.
- **Goodyear Tire & Rubber Co.**, 1144 E. Market St., Akron, wheel, brake assembly, $51,491; wheel assembly, $45,649.
- **Gosiger, C. H., Machinery Co.**, 108 McDonough St., Dayton, drill press, $662,378.
- **Hammond Mfg. Corp.**, 3600 E. Foothill Blvd., Pasadena, maintenance docks, 5 ea., $93,934.
- **Hart, Earl, Woodworking Mach. Co.**, 565 W. Washington Blvd., Chicago, sawing machines, 41 ea., $42,985.
- **Harvey Machine Co., Inc.**, Torrance, Calif., forgings, $21,000,000.
- **Haydon, A. U., Co.**, 232 N. Elm St., Waterbury, Conn., timer, camera, 450 ea., $44,653.
- **Holes, Floyd A., Co.**, 100 Northfield Rd., Bedford, Ohio, envelope assembly, 9,000 ea., $41,850.
- **Hyatt Bearings div.**, General Motors Corp., Harrison, N. J., roller bearings, $104,450.
- **Lear, Inc.**, 110 Ionia Ave., Grand Rapids, parts for screwjacks, $87,670.
- **Lewis Engineering Co.**, 339 Church St., Naugatuck, Conn., indicators, $99,190.
- **Marlin Rockwell Corp.**, 402 Chandler St., Jamestown, N. Y., bearings, 30,600 ea., $26,700.
- **Mine Safety Appliances Co.**, Pittsburgh, detector, $26,909.
- **Minneapolis-Honeywell Regulator Co.**, 2600 Ridgway Rd., Minneapolis, spare parts, $29,762.
- **Monroe Aire, Inc.**, 24 E. Front St., Monroe, Mich., static discharger, $26,850.
- **Moran Paint Co.**, Kiser & Leo Sts., Dayton, paint remover, 100,700 gals., $153,064.
- **National Die Casting Co.**, 3633 Touhy Ave., Chicago 45, machinery & equipment, $224,000.
- **Pastushin Aviation Corp.**, Los Angeles, aluminum alloy, 10,600 ea., $1,738,400.
- **Pesco Products**, 24700 N. Miles Rd., Bedford, Ohio, maintenance parts, $97,762.
- **Pfaff & Kendall**, 84 Foundry St., Newark, N. J., mast, 940 ea., $260,972.
- **Pyles Industries, Inc.**, 8926 Second Ave., Detroit, drill, 1,000 ea., $26,100.
- **Revere Electric Mfg. Co.**, 6009 Broadway, Chicago, floodlight, 407 ea., $36,874.
- **Standard Coil Products Co., Inc.**, Kollsman Instrument Corp., Elmhurst, N. Y., true airspeed & mach. No. computer, $32,258.
- **Sunbeam Corp.**, Chicago, indicators, 3,012 ea., $144,525.
- **Technical Tape Corp.**, 177th St. & Harlem River, Bronx, N. Y., tape, $33,111.
- **Turco Products, Inc.**, 6135 S. Central Ave., Los Angeles, paint remover, 116,000 gal., $193,900.
- **Upland Mfg. Co., Inc.**, Upland, Ind., envelope assembly, 50,000 ea., $51,500.
- **U. S. Rubber Co.**, 1230 Ave. of the Americas, New York, flexible ducts, $30,202.
- **Vanant Products**, 1301 Superior Ave., Tomah, Wis., envelope assembly, 15,000 ea., $60,750.
- **Yates-American Machine Co.**, Detroit, sawing machines, 61 ea., $67,100.
- **Busca Manufacturing Co.**, 2222 N. Olney St., Indianapolis, aircraft seats, $96,773.
- **Becco Sales Corp.**, Buffalo, hydrogen peroxide, $198,750.
- **Fairchild Engine division**, Fairchild Engine & Airplane Corp., Farmingdale, L. I., N. Y., powerplants, 65 ea., $94,935.

PRODUCTION BRIEFING

▶ **Hayes Aircraft Corp.**, Birmingham, Ala., completed its initial B-25 twin-engine trainer modification for USAF on schedule. Hayes' present commitments extend into 1955.

▶ **Kaman Aircraft Corp.**, Windsor Locks, Conn., has broken ground on its Navy-sponsored helicopter plant in Bloomfield, Conn. Occupancy is scheduled in 10-12 months.

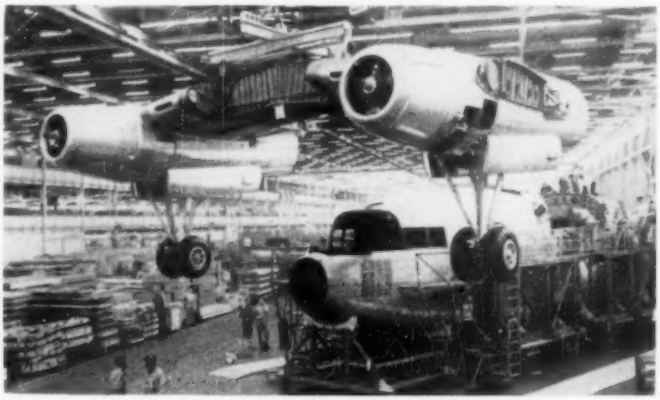
▶ **Norden Instruments, Inc.**, Milford, Conn., has received a $2-million Navy contract for advanced type bomb director systems, and an additional $1-million facilities contract for added machine tools.

▶ **Townsend Co.**, New Brighton, Pa., has begun construction of a $500,000 plant with 85,000 ft. of the floor space for its Cherry Rivet Co. division at Santa Ana, Calif.

▶ **Van Dusen Aircraft Supplies** has broken ground on a new office and showroom at Teterboro Air Terminal, N. J.

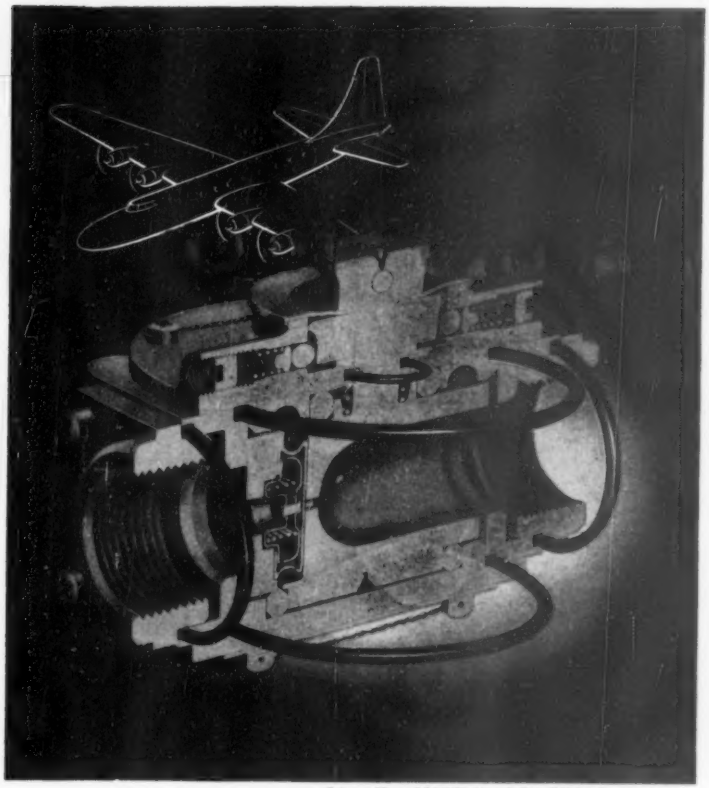
▶ **Solar Aircraft Co.**, Des Moines, has started production at its new 300,000-sq. ft. Wakonda plant, which will handle components for the J33, J35, J47 and J71 engines.

▶ **Western Sky Industries**, Oakland, Calif., has been granted over $3.5 million in contracts by Douglas Aircraft Co., for AD-4 and AD-5 Skyraider Navy attack plane parts.



WILLOW RUN PACKET PRODUCTION

Typifying modern aircraft assembly techniques, this photo shows a C-119 Packet center section complete with engines and landing gear being maneuvered into place for mating with a fuselage on the Kaiser-Fraser Packet line at Willow Run. The heavy tubular assembly jigs clustered around the fuselage typify big production setups.

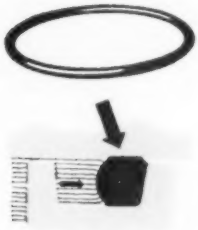


Cutaway View of PARKER Aircraft Shutoff Valve Showing O-Rings.

Leakproof Seals...Simple to use

WHEN YOU SPECIFY PARKER O-RINGS

THIS IS IT



Cross section drawing of O-ring in groove, sealing under pressure.

PARKER synthetic rubber O-rings provide perfect, leakproof sealing with economy of weight and space . . . without special complicated design . . . just a groove for the O-ring is needed. Economical in first cost, easy and simple to replace. For moving and non-moving applications.

PARKER is the one source for all standard O-rings to meet specifications covering fuel, hydraulic and engine oil services . . . and for special service O-rings of tested and approved compounds. Ask your PARKER O-ring Distributor for Catalog 5100, or write direct to The PARKER Appliance Company, 17325 Euclid Avenue, Cleveland 12, Ohio.

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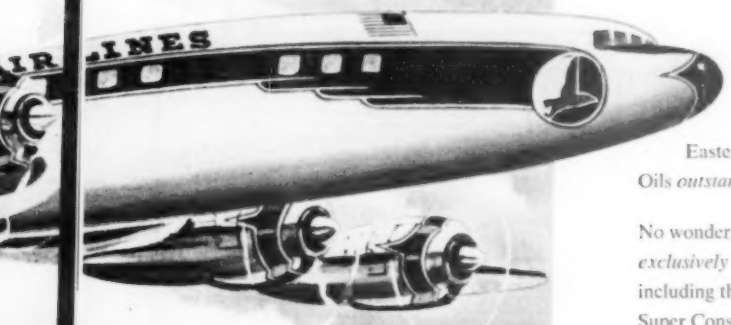
Eastern's NEW Great Silver Fleet

uses SINCLAIR Aircraft Oils!

..4th year of exclusive use by Eastern!

Eastern's NEW Great Silver Fleet. From top to bottom, the New-Type Constellation, Super Constellation, and Silver Falcon.



Eastern Air Lines has proved Sinclair Aircraft Oils *outstanding* through millions of miles of air travel.

No wonder, then, that Sinclair Aircraft Oils are used *exclusively* in Eastern's new, Great Silver Fleet – including the magnificent new 88-passenger Super Constellation, the New-Type Constellation, and the new Silver Falcon.

Yes, Sinclair lubricants *reduce* costs and provide fine, *safe* aircraft engine lubrication.

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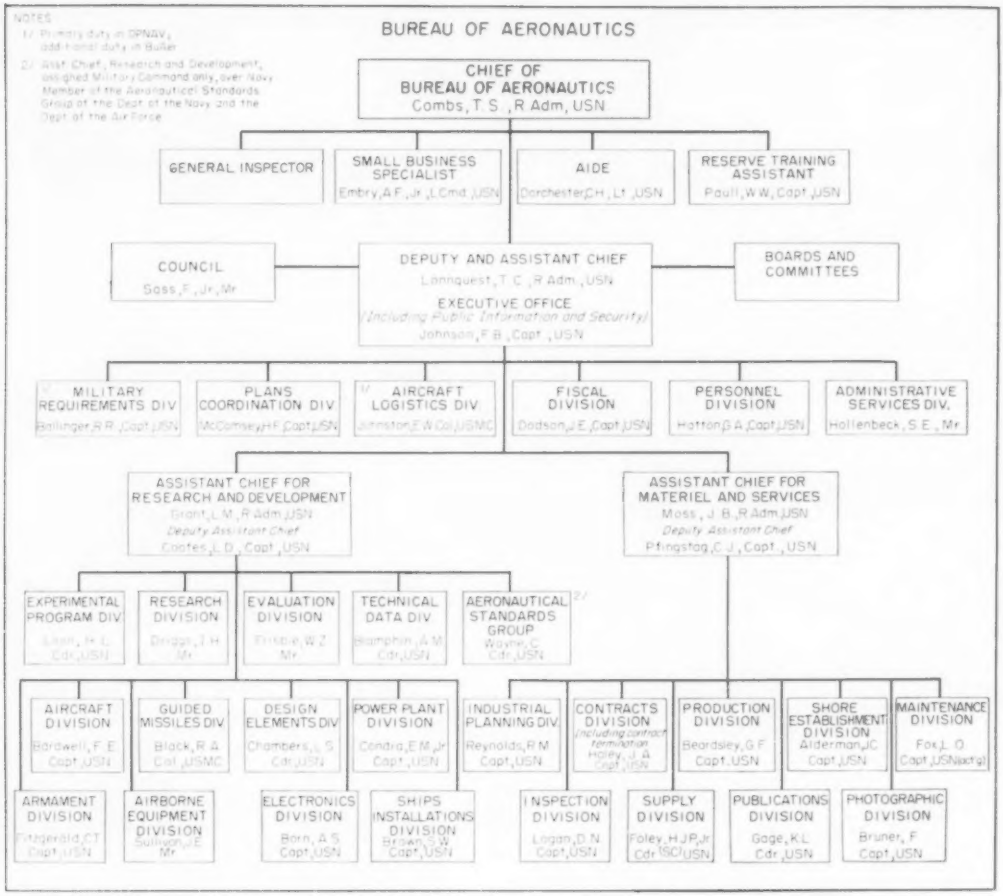
FACTS FOR FILING



Aviation Week, 4-28-52

Marine Corps Aviation Personnel

Year	Officers	Enlisted	Civilian
1945	15,841	109,321	11,844
1946	11,845	68,677	4,913
1947	3,264	33,077	4,592
1948	2,360	12,922	5,840
1949	2,228	16,614	4,780
1950	2,108	13,151	4,738
1951	3,027	22,145	5,201

SOURCE: U.S. Navy
Aviation Week, 4-28-52

What "Facts for Filing" do you want? Write: The Editors, Aviation Week, 330 West 42 St., New York 36, N. Y.

International & Domestic Scheduled Airlines

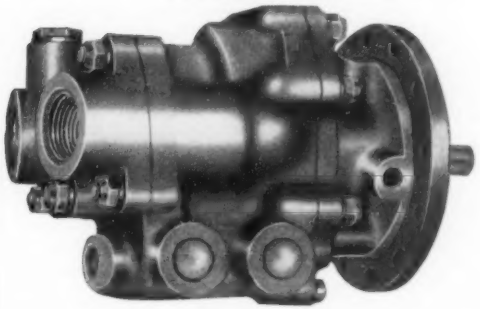
YEAR	Miles Flown	Passengers Carried	Passenger-Miles	Cargo Ton-Miles	Mail Ton-Miles	Average number of passengers per aircraft	Average distance flown per passenger
	(millions)	(millions)	(millions)	(millions)	(millions)	(number)	(miles)
1937	57	0.3	340	n.a.	n.a.	9.3	1,160
1947	116	2.1	1,868	261	90	16.5	912
1948	133	2.6	2,373	334	115	16.4	926
1949	136	2.5	2,478	290	128	17.3	1,000
1950	150	2.7	2,763	348	143	17.1	1,044
1951	162	3.1	2,727	405	164	17.5	942
	INCREASE OR DECREASE BETWEEN YEARS						
1947-48	+ 15%	+ 19%	+ 27%	+ 28%	+ 28%		+ 1%
1948-49	+ 2%	+ 12%	+ 10%	+ 24%	+ 11%	+ 6%	+ 8%
1949-50	+ 9%	+ 10%	+ 12%	+ 20%	+ 12%	+ 10%	+ 5%
1950-51	+ 8%	+ 15%	+ 21%	+ 16%	+ 15%	+ 1%	+ 1%
1937-51	+ 184%	+ 1,033%	+ 1,026%	n.a.	n.a.	+ 88%	+ 51%
1947-51	+ 39%	+ 48%	+ 78%	+ 203%	+ 82%	+ 6%	- 6%

Exclusive of USSR, satellites, China, and Japan.

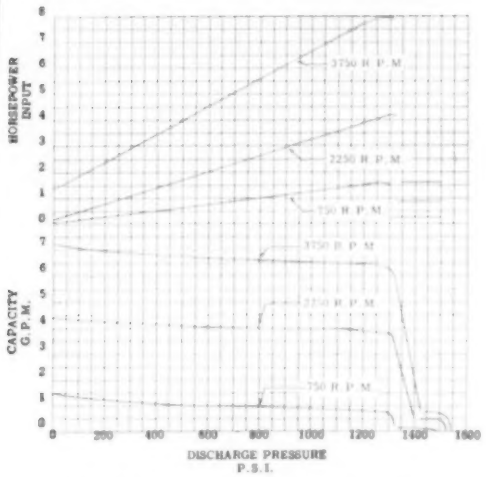
SOURCE: International Civil Aviation Organization

Aviation Week, 4-28-52

SIX BIG REASONS for using Pesco unloading hydraulic gear pumps:



Capacity: 2 g. p. m. @ 1500 r. p. m. @ 1250 p. s. i. Maximum operating pressure 1500 p. s. i. Weight: 8.9 lbs. approx.


HORSEPOWER INPUT
CAPACITY G. P. M.
3750 R. P. M.
2250 R. P. M.
750 R. P. M.
3750 R. P. M.
2250 R. P. M.
750 R. P. M.
0 200 400 600 800 1000 1200 1400 1600
DISCHARGE PRESSURE P.S.I.

This chart shows performance characteristics of Pesco Unloading Pump. Write for detailed engineering drawings and performance data.

1. Fewer parts

2. Easier to recondition

3. Longer service between overhaul periods

4. Lighter weight

5. Lower initial cost

6. Lower maintenance costs

The Pesco *Unloading* Hydraulic Gear Pump is the most economical and dependable pump built for applications where a variable volume of hydraulic fluid is required. This Pesco pump automatically adjusts flow of fluid to increasing and decreasing demands of the hydraulic system. It incorporates a main and a pilot pump as well as unloading and relief valves in one unit. And it's "pressure loaded"—Pesco's exclusive, patented design principle that assures extremely high operating efficiencies over a long, trouble-free pump life because it *automatically* compensates for wear. For the complete story write today.

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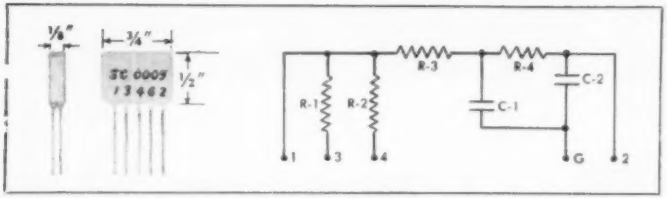


MINIATURE PACKAGE of six printed and connected resistors and capacitors typifies. . . .

New Gains in Printed Circuitry

Tiny pack units designed to meet closer production tolerances also have improved temperature ranges.

By Philip Klass

Printed circuit techniques, while not new in themselves, are making a new bid for use as weight- and space-saving components in military electronics equipment. The bid is made by new printed circuit packs containing up to six resistors and capacitors pre-connected into a desired circuit.

According to data furnished by the manufacturer, the Stupakoff Ceramic and Manufacturing Co., Latrobe, Pa., the new printed circuit packs appear to come closer to meeting the temperature characteristics and manufacturing tolerances required for avionics equipment than did earlier printed circuits.

▶**Fewer Connections**—Because the resistors and capacitors are printed in the desired circuit configuration, with interconnections already made, many soldered connections are eliminated. This means faster assembly and wiring with less chance for wiring errors and bad connections. That in turn means fewer rejects and less time spent in trouble-shooting and rework.

Equally important is the weight- and space-saving feature of the new printed resistor-capacitor circuits. In addition to direct saving over the use of individual resistors and capacitors, the new unit eliminates many of the mounting strips normally required.

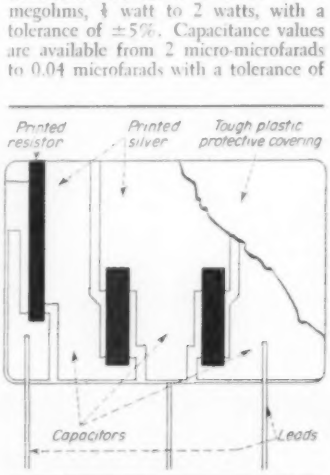
The Stupakoff printed circuit packs are currently available in a variety of integrator, interstage coupling, and other standard network circuits. Special circuits can be made to order, the manufacturer says.

▶**Temperature Characteristics**—The new printed circuit packs are available for operation in two different temperature ranges. One, called the commercial, operates from +10C to +85C. The other, for military use, is designed for temperatures between −54C and +71C. The wider military limits require lowering the top operating temperature slightly.

Only negligible changes in capacitance occur within the specified temperature range because of the natural temperature compensation of the dielectric base plate, Stupakoff says. Resistance values are said to hold constant within ±2% in the specified temperature range.

Exposure of the military units to temperatures of 150C will not damage them, Stupakoff says, but their resistance and capacitance values will change markedly above 71C.

▶**Manufacturing Tolerances**—According to Stupakoff, the units are available with resistance values of 1 ohm to 6 megohms, ¼ watt to 2 watts, with a tolerance of ±5%. Capacitance values are available from 2 micro-microfarads to 0.04 microfarads with a tolerance of ±3%. Working voltage rating is 450 v. d.c.



CONSTRUCTION of new printed network pack.

Stupakoff prints patterns for resistors, capacitors, and conductors on a newly developed vitreous high-dielectric ceramic plate by a silk screen process. Silver is used for conductors and carbon graphite or other resistance material for resistors. Capacitors are created using the natural dielectric properties of the ceramic base material.

The resistors, capacitors, and conductors are permanently bonded to the ceramic surface by a controlled curing process and are protected from abrasion and humidity by a plastic covering.

▶**Previous Developments**—To find out what the avionics industry might think of this new development, AVIATION WEEK talked with several manufacturers' engineers. One engineer expressed disappointment over his previous experience with printed circuits in general. He complained that work of several years ago had shown printed circuit characteristics varied too widely with temperature. However, he said the temperature tolerances quoted by Stupakoff made the new units seem attractive.

Most of the engineers queried are looking for components designed for temperatures of 90C, or higher. Stupakoff says that it is working to develop a dielectric material suitable for higher temperatures.

Another manufacturer said that the military had on one occasion suggested abandoning certain printed circuits in a new equipment because of unreliability. Another engineer questioned whether it would be economical to prepare special printed circuit templates for military equipment which is built in relatively small quantities.

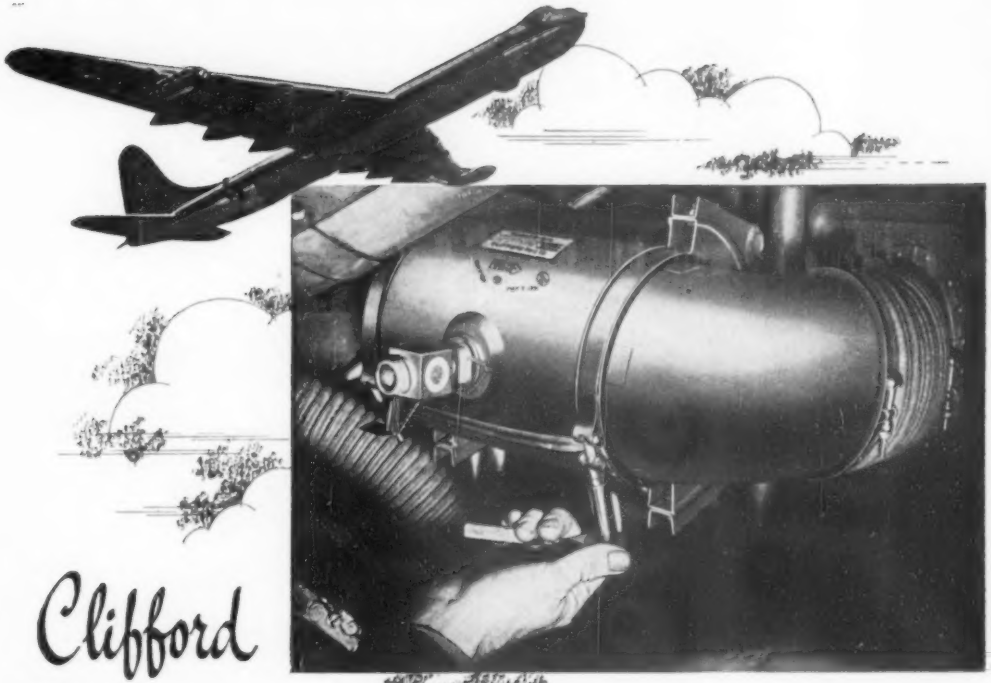
All these comments were based on previous printed circuit experience and not on the new units described here. But the potential advantages of the new printed circuit packs are so attractive that it seems probable the avionics industry will investigate them.

New Potting Materials

New plastic casting materials which cure at room temperature in less than 15 min. have been developed by B. G. Forman Co. for potting avionics assemblies and transformers.

Three different formulas provide either no shrinkage, slight shrinkage, or slight expansion of the plastic after curing, depending upon molding requirements. A low viscosity formula applied under vacuum can provide complete penetration and sealing of transformers.

B. G. Forman Co., Inc., 181 Throop Ave., Brooklyn 6, N. Y.



Clifford Feather Weights Cool the Oil in

WORLD'S LARGEST BOMBER, the Convair B-36D, has a 10,000 mile range and a ceiling of over 45,000 feet.

It uses a Clifford oil cooler to get rid of the heat generated in the constant speed drive which links the engine to the 400 cycle alternator. The oil cooler is essential to the proper operation of the unit under the varying conditions of takeoff and flight, and permits the use of a smaller size and lower weight drive.

CONVAIR B-36D BOMBERS

Conventional or jet powered, civilian airliner or world's largest bomber . . . all types of modern aircraft depend on Clifford Feather Weight All-Aluminum Oil Coolers . . . *the only all-brazed type* of oil coolers. Their superior weight-strength ratio is achieved through Clifford's patented brazing method and pre-testing in Clifford's wind tunnel laboratory . . . the largest and most modern in the aeronautical heat exchanger industry. For further details, write Clifford Manufacturing Company, 136 Grove Street, Waltham 54, Mass. *Division of Standard-Thomson Corporation.* Sales offices in New York 17, Detroit, Chicago 1, Los Angeles.

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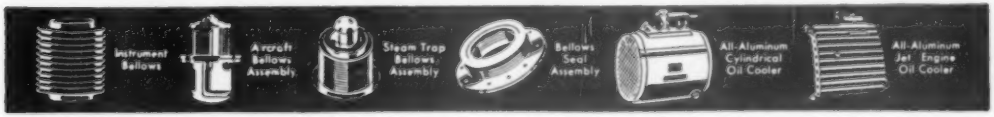
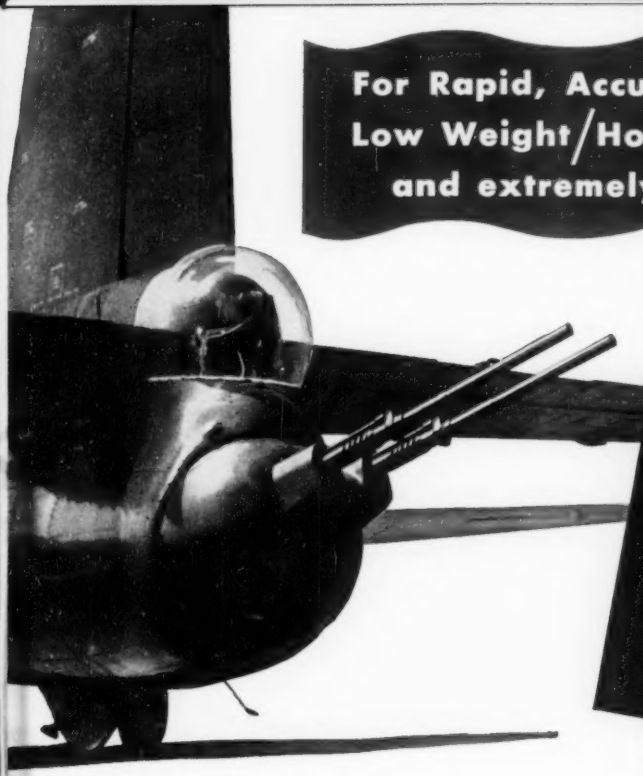
HYDRAULICALLY-FORMED BELLOWS AND BELLOWS ASSEMBLIES





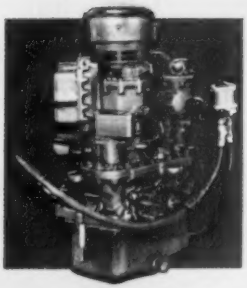
For Rapid, Accurate Control at Low Weight/Horsepower Ratio and extremely Low Inertia

The Navy's Lockheed P2V's USE VICKERS HYDRAULIC TRANSMISSION

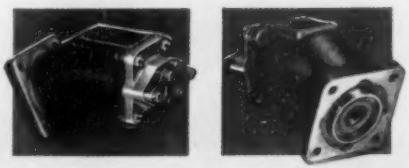
The Emerson Electric Mfg. Co. tail turret for the Navy's long range patrol bomber, Lockheed P2V's, is powered by a Vickers hydraulic transmission. This equipment comprises the power transmission and associated controls of the servo circuit. Accuracy and rapidity of response are fundamental characteristics of this Vickers equipment because of the extremely low inertia of rotating parts. The two separate hydraulic motors for train and elevation of the turret are individually and completely controllable in direction of rotation and speed by the application of a few milliamps of signal current.

Vickers hydraulic equipment is now used in a wide variety of servo circuits. Our engineers will gladly discuss their possibilities and advantages with you.

3757



Vickers Double Pump and Control assembly provides complete and independent control of speed and rotation of two hydraulic motors.



Vickers Hydraulic Motors can be stopped accurately to position without clutches or brakes . . . can be started and stopped instantly because of very low inertia of moving parts.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Graphite Solution Ends Blip Distortion

(McGraw-Hill World News)

Frankfurt—A simple and inexpensive means has been devised to prevent static-electricity charges on a radar scope from distorting radar "blips" on ground controlled approach sets.

Under extremely dry conditions, movement of the Plexiglas ruler-like tracking cursor, which is superimposed on the radar scope to establish the plane's track, builds up a static charge on the face of the scope. This charge shifts the "blip" slightly from its correct position.

Using a method devised by Capt. George R. Onufer, communications and electronics officer of the Airways and Air Communication Service wing headquarters in Germany, a liquid solution consisting of powdered graphite in carbon tetrachloride is sprayed on the face of the radar scope and on the cursor. This provides an electrical path to carry off the static charge caused by the friction.

The solution reportedly costs only a cent and a half per application. Each application is effective for a week.

GCA radar crews have found the new method to be effective and it has been recommended for use on all GCA units in the Europe-Africa wing of AACS.

Flight Transducers

Two new transducers to convert differential or absolute pressure measurements into 400-cycle a.c. signals in aircraft instrumentation or analog computers have been developed by Servomechanisms, Inc. The new units are in limited production.

The new devices use a Bourdon tube with cantilever suspension instead of the more conventional bellows mechanism. Variations in input pressure expand or contract the Bourdon tube, causing it to change the reluctance of a magnetic pickoff. This generates a pickoff signal proportional to input pressure changes.

Servomechanisms says that hystere-

Snap-on

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Indianapolis, Ind., Lincoln 4351
Jacksonville, Fla., 4-4460, 4-4469
Kansas City, Mo., WEstport 0364
Los Angeles, Calif., DUnkirk 83445
Milwaukee, Wis., WEst 3-3116-17
Minneapolis, Minn., GEneva 5367
Newark, N. J., ESsex 5-3197 98
New Orleans, La., RAymond 2418
New York, N. Y., JErome 7-7523
Oklahoma City, Okla., 3-4975
Omaha, Nebr., JAckson 6159
Philadelphia, Pa., POplar 5-7400-01
Pittsburgh, Pa., MOntrose 7600
Richmond, Va., 5-8115
St. Louis, Mo., NEwstead 1150-51
San Francisco, Calif., UNderhill 3-3195
Seattle, Wash., CApitol 3646
Syracuse, N. Y., 5-2224
Toledo, Ohio, ADams 1026

IN CANADA

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sis errors are reduced as a result of novel construction which uses no bearings or sliding contacts. The Bourdon tube is made of zero thermoelastic coefficient material to reduce its sensitivity to temperature changes, the manufacturer says. In addition, the transducer contains thermostatically controlled heaters which keep it above 25C to prevent water condensation and possible icing.

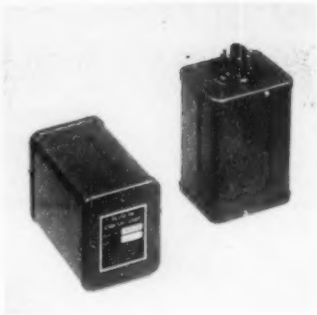
▶ **Two Models**—The differential pressure transducer, TR102, operates through a differential pressure range of 0 to 684 mm. Hg. and a maximum total pressure range of 87 to 1,444 mm. Hg.

The absolute pressure tranducer, TR101, operates between 0 and 760 mm. Hg. Each unit weighs less than 2¼x2¼x7¼ in.

When connected to a 1-megohm load, the units have a maximum output signal voltage of about 3 volts for the rated 30-v. a.c. excitation. The scale factor is approximately 0.00015 volts/volt excitation/mm. Hg. The signal voltage is proportional to input pressure within ±2% full scale.

Servomechanisms says the new units meet military specifications AN-E-19.

Additional information may be obtained from Servomechanisms, Inc., Westbury, Long Island, N. Y.



Small Plug-in Amplifier

A new miniature plug-in amplifier with a maximum voltage gain of 9,000 and a frequency response, flat within ±1 db., from 2 to 1,000 cps., has been developed by Engineering Research Associates, Inc.

The new amplifier is potted in a steel case measuring 1⅞ in. by 2¼ in. by 3 in. and weighs only 13 oz., according to the manufacturer. The unit plugs into a standard octal base.

Possible applications for the new single-stage amplifier include integrating circuits in which integration is achieved by a stabilizing negative feedback circuit. ERA says that the unit will accept an extraordinary amount of negative feedback without instability.

Significant characteristics of the new unit: input impedance, 5 megohms; input range, 50 microvolts to 2 millivolts rms.; maximum output, 20 volts rms.; power supply requirements, 600 ma., 6.3-v. filament supply; 0.5 ma., 250-v. plate supply; output impedance, 5,000 ohms.

Engineering Research Associates, Inc., Dept. A, 1902 West Minnehaha Ave., St. Paul 4, Minn.

Australia to Make Radar Equipment

(McGraw-Hill World News)

Melbourne—Australia is taking immediate action to start an industry to make radar for Air Force and other military needs as well as for civil use. The step follows closely on the heels of military expressions of dissatisfaction over the lack of new and replacement electronics equipment to meet growing defense needs.

Electronic Industries Ltd. of Melbourne will be the first Australian radar producer. It will turn out equipment for Navy ships and installations. A survey is now being made to confirm earlier estimates that vast quantities of radar equipment will be required for military

Why you should specify

G-E SILICONE RUBBER PARTS

for extra-high-temperature seals

When designs call for sealing rings and gaskets subject to unusual extremes of temperature, specify General Electric silicone rubber parts! They're ideal for high-heat sealing applications because they are able to withstand long exposure to 450 F without deteriorating or becoming tacky. G-E silicone rubber parts have low-compression set even under high heat, possess excellent dielectric and insulating properties.

Jet engines, for example, have many uses for G-E silicone rubber parts: oil seals, fire-wall seals and ignition cable shields. Why not investigate the remarkable properties of General Electric silicone rubber parts for *your* designs?

For more information, write to General Electric Company, Section 111-7G, Chemical Division, Pittsfield, Mass.

General Electric's complete fabricating service also offers you:

G-E mycalex parts – with a unique combination of properties, including high dielectric strength, dimensional stability and heat resistance up to 700 F.

G-E sealing caps and sleeves— to protect tubing and small parts from air, moisture, dirt, paint and chemicals . . . to insulate wires . . . and protect valves from mishandling.

GENERAL ELECTRIC

111-7

and essential civil services such as aviation and shipping.

Australia's expanding electronics needs had recently prompted talk of importing electronics equipment, possibly from the U. S. if reasonable delivery dates could be obtained.

Heat Is Big Problem In Avionics Equipment

Columbus, O.—Getting rid of heat generated in avionics equipment is a major problem today, judging from comments of the 300 engineers and physicists from more than 80 different airframe and avionics manufacturers and government agencies who attended the first conference held exclusively for the purpose of discussing the cooling problem.

Sponsored by the Ohio State University Research Foundation and the USAF, the meeting was held in Columbus last month.

Conference speakers urged that:

- Avionic equipment locations in the airframe be carefully chosen to ease cooling problems.
- Military environmental specs be revised.
- More high-altitude test facilities be set up.
- Better dissemination of data on avionics cooling be made.

Because of the keen interest shown in the recent conference and in the avionics cooling problem, the AF is considering arrangements for a classified conference to be held later in the year in Dayton.

Blowers Cause No Radio Interference

A new series of a.c. motor-driven blowers for cooling avionics equipment, designed to operate from a variable frequency (320 to 1,000 cps.) source, has been developed by American Electric Motors, Inc.

The motors are said to have improved speed regulation and reduced power consumption throughout the wide frequency range because of their increased stator stack size and reduced rotor diameter.

Since the new motors use no brushes, commutators or sliprings, they eliminate radio and radar interference, a shortcoming of most d.c. motors, the manufacturer states. The new series is designed to operate in the ambient temperatures ranging from −65C to 65C.

American Electric Motors, Inc., 4811 E. Anaheim-Telegraph Road, Los Angeles 22, Calif.

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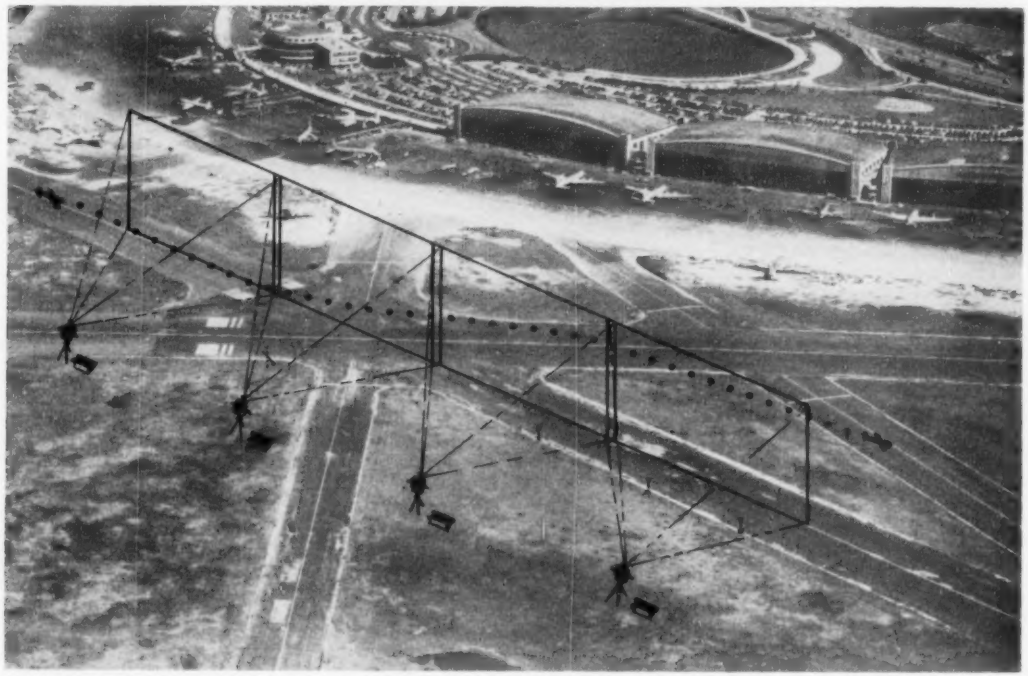


MULTI-CAMERA LAYOUT, such as this one superimposed on LaGuardia Airport, could photograph and record a long takeoff or landing.

New Camera Pinpoints Landing, Takeoff

Accuracy, ease of operation claimed for Fairchild unit: camera does not move while optical sight tracks plane.

By George L. Christian

A flight analyzer camera described by American Airlines, which has used it, as "startlingly accurate" has been developed by Sherman Fairchild & Associates Inc., New York.

Purpose is to record takeoff, and in-flight and landing characteristics of aircraft.

Grumman currently has a Fairchild analyzer camera on test (with jet planes) and Pan American World Airways has expressed interest in the instrument, according to the manufacturer.

▶ **AA Analysis**—American worked with an early version of the camera, and found these assets:

• **Versatility.** It is easily transportable. The whole package consists of one or more cameras (depending on length of flight operation to be analyzed), battery cart and simple, light-weight runway distance markers and anemometers, all of which may be packed up and hauled easily from one air field to another. Ability to move the camera to the aircraft instead of having to bring the plane to the instrument is a big advantage over large grid-type equipment whose installation is fixed.

• **Quick setup.** The Fairchild equipment is not only highly mobile, but is rapidly and easily set up at any surveyed airport, saving considerable time and effort.

• **Ease of interpretation.** Person analyzing plane's performance has only to take a photographic print to his desk and go to work. No special projection rooms or elaborate interpretive paraphernalia are required. Space accuracies of 1/1,000 in. on the photographic plate (equal to about ½ ft. on the runway) are obtained. Time precision of latest model is 1/1,000 sec.

• **Independence.** Unit's accuracy is not impaired by wind direction or position of the sun.

As a result of recommendations made by AA engineers, K. J. Fairbanks, Fairchild general manager and co-developer of the flight analyzer camera, was able to incorporate several improvements in the unit. These included a dual (instead of single) focal plane shutter and more accurate timing.

Sherman Fairchild directed the entire development. He also financed it out of his own pocket.

▶ **What You Get**—Here is what the new analyzer camera will give you, according to Fairbanks.

• **Altitude and angle of attack** of an aircraft is recorded for a complete maneuver.

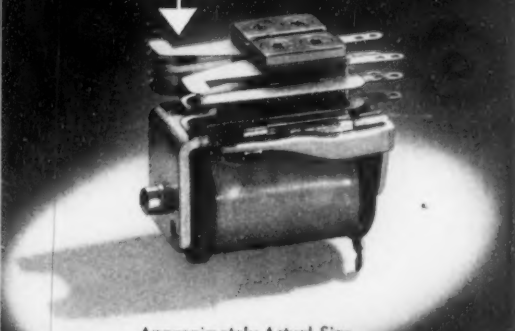
• **Glide and landing approach** paths at different throttle and flap settings and various flight attitudes are recorded exactly.

• **Ground speed,** length of takeoff runs or landing rolls, distance to clear obstacles under various conditions of gross

A NEW CLARE RELAY...

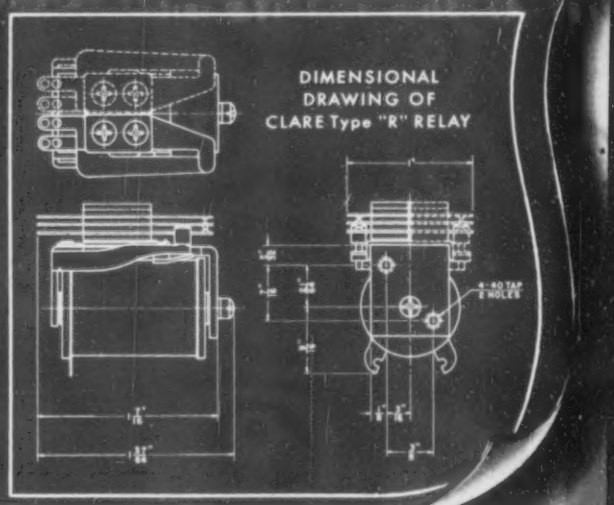
the Type "R" combines extremely small size with unusual sensitivity and long life

CLARE Type "R" RELAY



Approximately Actual Size

DIMENSIONAL DRAWING OF CLARE Type "R" RELAY



SPECIFICATIONS

SIZE
Length: 1 7/16" — Height: 1 3/64" — Width: 1"

WEIGHT
Approximately 2 ounces

COIL
Single or double-wound

OPERATING VOLTAGE
Up to 230 volts d-c

ARMATURE
Single or double arm

CONTACT ASSEMBLY
Form A to C. Maximum of 10 springs in each pileup.

MOUNTING
Two #4-40 tapped holes in end of heelpiece

● This new CLARE Type "R" d-c Relay embodies many features of the famous CLARE Type "K" Relay, which was the first to combine the advantages of a telephone-type relay with the small size, light weight and resistance to vibration required to meet the rigid demands of aircraft service.

In appearance, the Type "R" resembles the Type "K", but, through hardly noticeable structural differences, CLARE has given the new Type "R" even greater sensitivity and operating range. Both relays use the same contact springs, but the Type "R" coil is longer and of larger diameter, to provide greater winding space. Life expectancy of the new relay has been not only increased but multiplied.

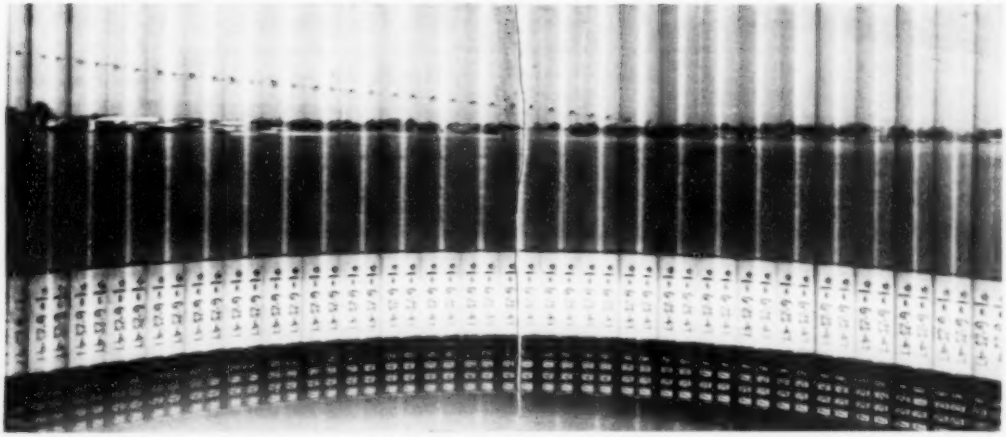
The CLARE Type "R" Relay retains in an improved form the reed armature suspension which discerning engineers have come to recognize as one of the subtler reasons for the superior performance of CLARE Type "K" Relays over other relays of comparable size and somewhat similar appearance.

The Type "R" is available as either an open or hermetically sealed relay. Clare sales engineers are located in principal cities to give you firsthand information on this new relay and to cooperate with you on any complex relay problem. Call them or write to C. P. Clare & Co., 4719 West Sunnyside Avenue, Chicago 30, Illinois. In Canada: Canadian Line Materials Ltd., Toronto 13. Cable Address: CLARELAY.

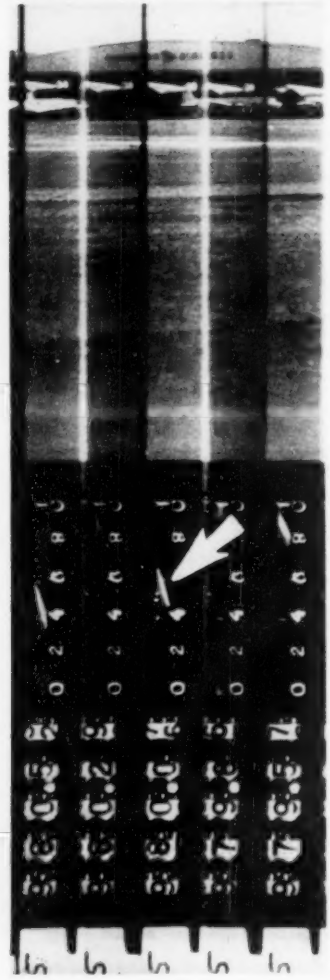
Write for CLARE Bulletin No. 115

CLARE RELAYS

First in the Industrial Field



COMPLETE TAKEOFF is registered by Fairchild analyzer camera, giving graph-like plot of plane position against time. White strip shows flight number and date.



THOUSANDTH of a second may be read from position of spiraling white brush mark (arrow), here between digits 5 and 6.

weight, engine power, flap settings, etc., is given, allowing acceleration and propulsive thrust to be determined.

• **Actual developed lift** coefficient can be calculated.

• **Variations in attitude** or altitude during speed run tests can be established by the analyzer. It gives an accurate speed-space record permitting study of speed variations. Effects of wind aloft can be determined by averaging up and down wind run results.

• **Reversible pitch** propeller deceleration can be determined, as well as effective reverse thrusts.

Synchronization of flight analyzer and auto observer flight instrumentation can be accomplished by flashing a Grimes light which shows up on the plate, synchronizing time sequence on the auto observer and analyzer. A Very pistol firing a flare on to the runway serves the same purpose.

▶ **Analyzer Advantages**—Fairbanks stresses these features of the instrument:

• **No sines or cosines.** Fairchild's camera remains stationary, does not swing to follow movement of aircraft. Therefore the photographic plate (or film) remains parallel to the plane of flight. Result is that no sine or cosine corrections due to triangulation are necessary, and engineering manhours are saved.

• **Same size images.** Corollary benefit of plate remaining stationary and parallel to runway is that plane's images on the film are all of the same scale. No mathematical corrections are necessary to correlate images of different sizes, further reducing engineering work.

• **Long takeoffs recorded.** Takeoffs of almost indefinite length can be recorded by Fairchild equipment. If an extra long takeoff (heavily laden jet, for instance) is anticipated, a multi-camera installation may be set up, overlapping at each edge. Thus a maneuver of several miles may be recorded with the plane's image remaining a constant size and not shrinking to an invisible speck at either end of the run. With constant-size image comes constant accuracy of computation, and additional time saving.

▶ **Inside Dope**—Components of the Fairchild camera which combine into the finished product are:

• **Wide angle lens** (90 deg.) which scans maximum length of runway. Lens currently used is a 6-in. focal length, f. 6.3 Metrogon, similar to those in Fairchild aerial cameras.

• **Masking slide**, moving transversely across an 8x10-in. plate (or film), permits multiple strip exposure of the single plate.

• **Focal plane shutter**, moving with the sliding mask, gives each strip a 1/400-sec. exposure. Newly adopted second focal plane shutter simultaneously photographs time and data card at 1/1,600 sec. through a special portrait lens.

• **Panning head attachment** helps operator to swing masking slide across plate smoothly when following aircraft.

▶ **How It Works**—Camera, distance markers and anemometers are set up on test runway. Plane starts takeoff run at extreme right limit of lens' vision. Operator follows aircraft through optical sight by swinging bicycle-type handles which start masking strip and integral shutter across face of photographic plate. When masking strip has moved a strip-width (.147 in.), one of a pair of precision-wound solenoids trips the 180-deg. rotary focal plane shutter, exposing a strip of film. As masking

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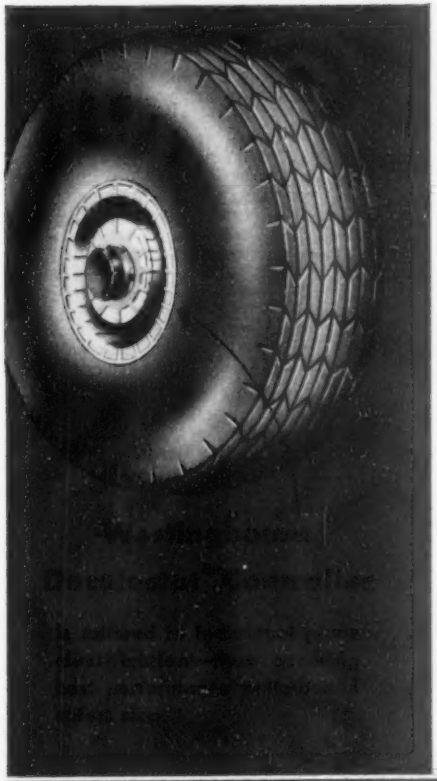

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LATEST development of Fairchild camera has optical sight on top. Sight moves, camera remains still. Black box under camera is panning head for smooth tracking.

strip-shutter combination moves across film (shutter slides on a bar) a gear rack spins a small pinion to drive a single-lobe cam through a gear train. Cam actuates two Micro-switches, one at each 180 deg. of cam rotation. Micro-switches energize precision solenoids which rotate shutter through mechanical lever arm.

So, as operator follows aircraft on its takeoff and the slit slides over plate, the solenoids snap shutter as rapidly as needed to take up to 65 strip-photos on one 8x10 plate.

Simultaneously, the second shutter is recording time and data from the card held in front of the camera on an extension arm. The data card shows date and number of flight.

▶**Fast Timer**—The timer is a five-digit rotary counter made by Veeder Root. The third digit from the bottom indicates seconds, the fourth tenths and the fifth hundredths of seconds.

Here is where Fairbanks hit a snag. He wanted greater time accuracy, down to 1/1,000 of a second. But, if he sped the counter up to make the fifth counter record thousandths of a second, it whirled past the shutter so fast that only a blur was registered on the plate.

Fairchild engineers attached a small drum to the fifth counter. Ten helical white lines on the drum spin behind a narrow, stationary slit along one edge of which appear the digits 2, 4, 6, 8, 0. Each helical line on the drum represents 1/100 sec. and its movement from bottom to top of the slit takes 1/100 sec. By means of the scale adjacent to the slit it is possible to split this time into tenths—or read 1/1,000 of a sec.

▶**Special Features**—Tolerances of the Fairchild camera are held so tight that

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They Write Their Own Timetables

Corporate use of single-engine planes is spreading at a rate which gives emphatic proof of their utility. An estimated 7,500 aircraft of this type comprised this "business fleet" in 1951, an increase of some 25 per cent since 1948.

Such craft not only bring points off main airline routes within range of fast air travel, but lessen businessmen's dependence on hard-and-fast timetables. More and more of them are writing their own, and saving countless hours of time.

As builder of the engines powering the greater number of these planes, Continental Motors is gratified, naturally, both at the proof of utility which such acceptance reflects, and at users' clear preference for planes with Continental power. Needless to say, it stands committed to the policies which have fostered this preference.

Continental will continue its emphasis on aggressive engineering, its adherence to highest standards of material and workmanship, and far from least important, on the maintenance of parts and service wherever businessmen—or anyone else—may fly.

Powerful as the Nation 50 Yrs 1902 1952

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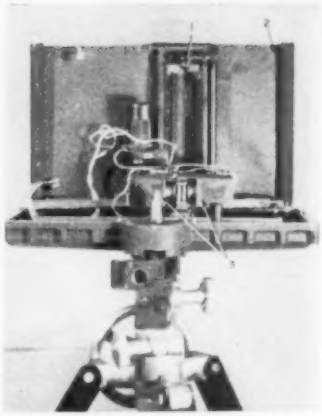


DISASSEMBLED view shows focal plane shutter (1) which moves with masking slide (2). Solenoids are below (3).

the gear rack can be fastened at one end only—the other floats to compensate for any slight variations which might cause binding of the gears.

A problem still exists. Fairbanks admits, in controlling the shutter firing time precisely, especially if change of speed is great. Difficulty lies in controlling Micro-switch contact time exactly, existence of slight back-lash in gear train driving switch-controlling cam and in matching solenoids to give identical operating characteristics.

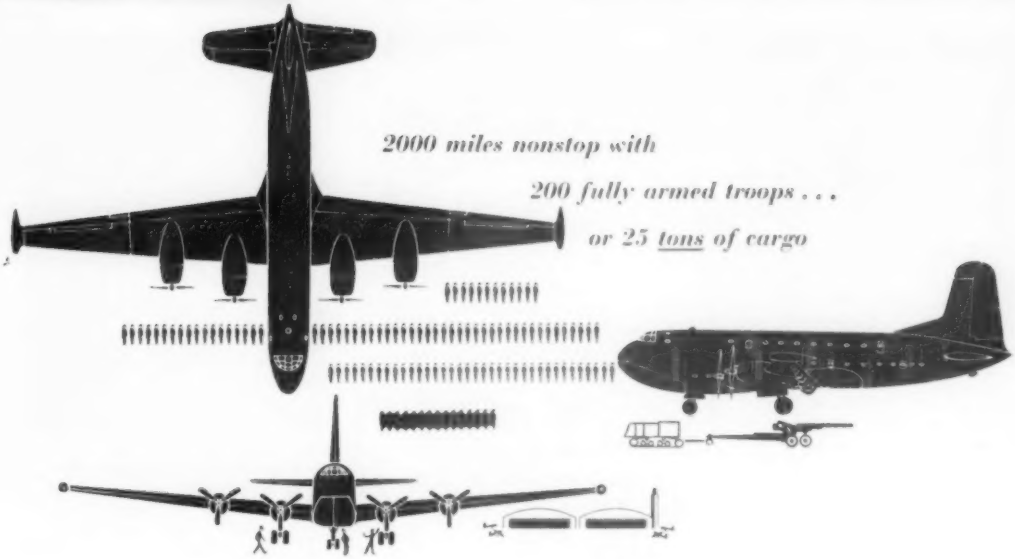
To control solenoid operation, Fairchild had them specially designed and wound by Dr. Herbert Rotors, a consulting engineer. Each pair's characteristics are checked on an oscilloscope to assure identical operation.

▶**How It Started**—Appalled at the immense task of calculating required to measure thrust of a propeller and its effect on the performance of a small plane that did not perform according to predictions, Fairbanks, in collaboration with Sherman M. Fairchild, hunted for a neater, cheaper and faster method of obtaining the desired data. This was during World War II.

First flight analyzer was a modified Bolex movie camera rigged for single frame operation. It was driven through a rotary solenoid by a Fairchild intervalometer, timing exposures evenly at ¼ sec. Pictures were taken through a grid screen.

Next step was a still camera using the multiple strip principle, suggested by Dr. John H. Hett, director of the New York University Jet and Flame Research Laboratory. But this camera used a standard between-the-lens shutter which was difficult to re-set rapidly. So Fairbanks worked out the single focal plane which traveled with the slit.

This solved the quick-tripping prob-



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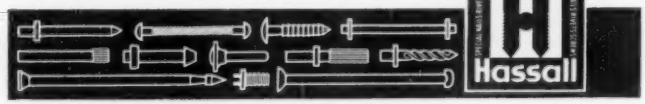
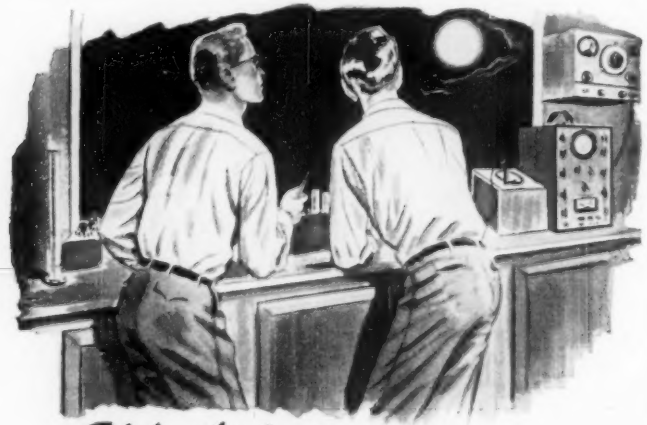




Sky's the limit **... OR IS IT?**

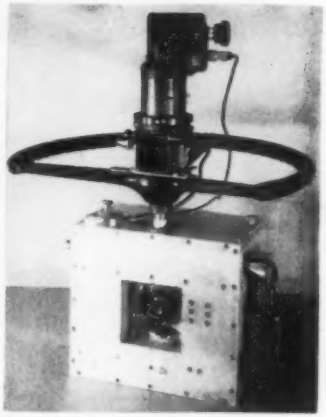
● With man's mastery of the air one wonders if there's any reasonable limit to the advance of science ... with broad horizons, we at Schuttig combine electronic engineering skill with vision and understanding ... our products reflect quality and design superiority. We can probably help you with your designs or production.

Schuttig & Company

INCORPORATED

WASHINGTON 17, D. C.

ELECTRONIC MANUFACTURING ENGINEERS



FIRST VERSION of the analyzer camera had a between-the-lens shutter, replaced later by focal plane shutter.

lem, but another headache developed. If the shutter speed were fast enough to stop the fast-spinning digital counter, the main picture of the plane's performance was badly under-exposed. If shutter speed were geared to proper exposure of the plane, counters were blurred.

Outcome was the two-speed shutter. Plane picture is taken at a comfortable 1/400 sec., fast enough to "freeze" the plane, slow enough to give plate or film ample exposure. Time and data card are illuminated separately and a 1/1,600-sec. shutter snaps its record fast enough to give clear pictures of its information which is superimposed on the bottom of the main picture.

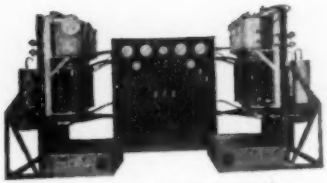
▶ **What Next?**—Fairbanks feels that the analyzer camera has reached a stage of development where it can do a definite job for airframe manufacturers, airlines and the military with great accuracy, and at comparatively low cost.

He is encouraged by American's high opinion of the analyzer and by Grumman's interest in the camera for checking jet aircraft performance.

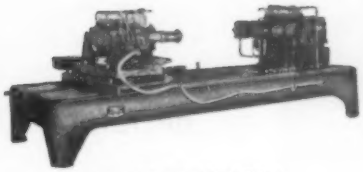
Already, Fairchild engineers have conceived a shutter with the same high speed characteristics as the existing component, but which will give accurate timing in spite of variations in battery voltage or electrical contacts.

Also, for taking pictures of extra-highspeed aircraft where a battery of cameras are used, provisions will be made to track the aircraft a short distance before actual photographing is started. This lead-in, lead-out feature will improve accuracy of overlapping film mosaic.

Fairchild officials are sure their instrument can perform vital services for the government guided missile program—at least in the subsonic region.

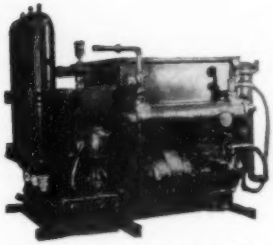


Universal Jet Fuel Nozzle Test Stand

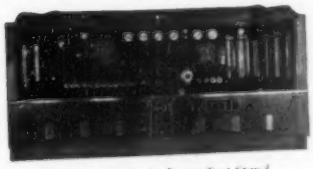


Universal Torsional Shaft Tester

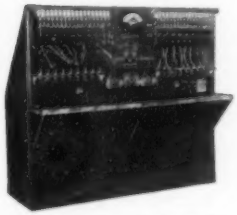
Universal Propeller Governor Tester



Rock Crusher Hydraulic Power Pack



Jet Engine Lube Pump Test Stand



Universal Magneto Test Stand

"But who tests the test equipment?"

Greer engineers test it—many times over, under conditions far more severe than normal operation—before it ever leaves the plant. For we know that testing equipment must have the complete confidence of those who use it. Greer equipment deserves that confidence, and has it—because it has earned it.

Not mass produced by the multi-thousands, each Greer test stand is painstakingly engineered, and is carefully tested in each stage of production for absolute accuracy. The men who design them and the men who build them have many years of specialized experience in this narrow field. It is experience that is difficult to find—perhaps impossible to match elsewhere.

In addition to standard models, many special machines have been developed to meet specific requirements. A staff of creative engineers is always available for a discussion of out-of-ordinary problems. Write or call today; no obligation.

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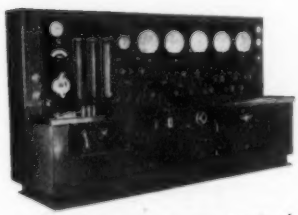
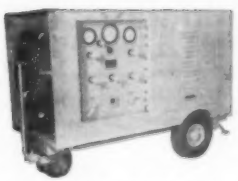
FOR AVIATION AND INDUSTRY



Master Hydraulic Pump Accessory Test Stand



Portable Hydraulic Test Stand

Servicenter for Aircraft Accessories

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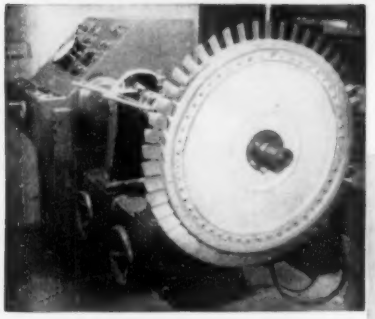
Field Offices: Greer Hydraulics, Inc., 298 Commercial Building, Dayton, Ohio • 2832 East Grand Boulevard, Detroit, Michigan

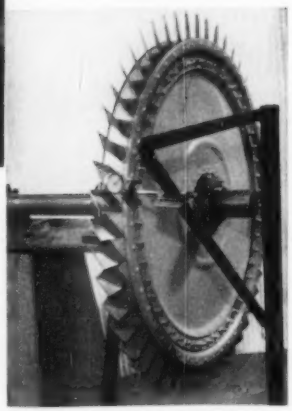
Representatives: Thomson Engineering Service, 708 Hemphill Street, Fort Worth 4, Texas • Harold E. Webb, 918 N. Kenilworth Avenue, Glendale 2, California

how DEAN & BENSON serves the aircraft industry



In order to assure our customers of a minimum of vibration due to imbalance, each fan assembly is dynamically and statically balanced as shown above.

This is the final operation before shipment so that each fan assembly —which is individually boxed—may be installed directly in the aircraft as it is unpacked.



Another method used to insure to our customers a minimum of operational difficulties.

Each fan is checked for runout at the hub, the bulkhead and the blade tips, as shown in the above photograph. By maintaining close limits of this runout, it is possible to install the stator, and variable inlet vanes when required, within thousandths of an inch of the fan to prevent 'air leakage' and re-circulation, thereby increasing the fan efficiency.

These engine cooling fans, engineered and tested by DEAN & BENSON RESEARCH, INC., and built by *THE BENSON MANUFACTURING COMPANY, KANSAS CITY, MISSOURI*, undergo many other tests and inspections in order to insure to our customers the precision equipment demanded by the aircraft industry.

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- Package Power Plants
- Power Plant Cooling Development
- Fan and Blower Calibration
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Inspection Benches

Rubber Curing Racks

Movable Spindle Gear and Turbine Wheel Racks

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Scintilla Lists 24 Analyzer Customers

Ignition analyzers for commercial aircraft are rapidly gaining favor among U.S. and foreign airlines. An indication of the trend is the recent announcement by Scintilla Magneto division, Bendix Aviation Corp., of orders for analyzers from 11 domestic and 13 foreign customers.

American Airlines is embarking on a fleet-wide program installing wiring for the Scintilla instrument. Initially the analyzer will be used on a portable basis and will not be permanently installed in the aircraft. Scintilla officials predict that American will adopt a "systematic approach" and go to airborne analyzers on all four-engine aircraft after thorough personnel training. They even speculate on the possibility of American installing the unit in twin-engine Convairs.

An AA spokesman has told AVIATION WEEK that his company would consider airborne installations only after extensive evaluation of the equipment.

AA is purchasing 43 Scintilla analyzers; price is not revealed.

Scintilla has designed and built five "training rigs" which are to the analyzer what a flight simulator is to an aircraft. All sorts of engine malfunctions may be duplicated on the rigs, spotted on the analyzer and corrective action taken. The company expects to reduce training costs considerably with the simulator rigs.

Scintilla engineers will initially indoctrinate AA personnel.

Among the advantages Scintilla expects from the trainers:

- **Taking the rigs** to the trainees instead of requiring trainees to travel to Sidney, N. Y., to learn about the analyzer, will save time, money and travel.
- **Smaller staff of instructors** can teach a large number of students.

Scintilla developed the training rig especially for the American program. It predicts this will set a pattern for instructing airline personnel in the use and interpretation of analyzers in the future.

Domestic airlines buying Scintilla analyzers, either for test cell, portable or airborne use, in addition to American: United, Chicago & Southern, Delta, Continental, Eastern, National, Northeast, Slick, and the first commercial helicopter installation, Los Angeles Airways.

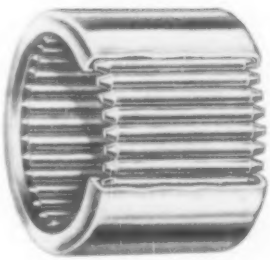
These 13 foreign carriers have ordered the analyzer: Trans-Canada, KLM, Trans Australia, British Commonwealth & Pacific, CAT, Inc., SAS, LAV, Sabena, El Al, Air France, Iberia, LAI and Greek Airlines (TAE).

Get in the Scrap—Turn Yours in for Defense

when high capacity pays off...

Torrington Needle Bearings are designed to handle heavy loads. A full complement of small diameter rollers distributes the load evenly over a large area. Thus—for a given O.D.—a Needle Bearing has greater rated radial load capacity than any other type of anti-friction bearing.

Other Needle Bearing advantages—compact size, light weight, ease of installation and maintenance—pay off, too. So let our engineers help you—as they have many others—take full advantage of Torrington Needle Bearings in *your* product.



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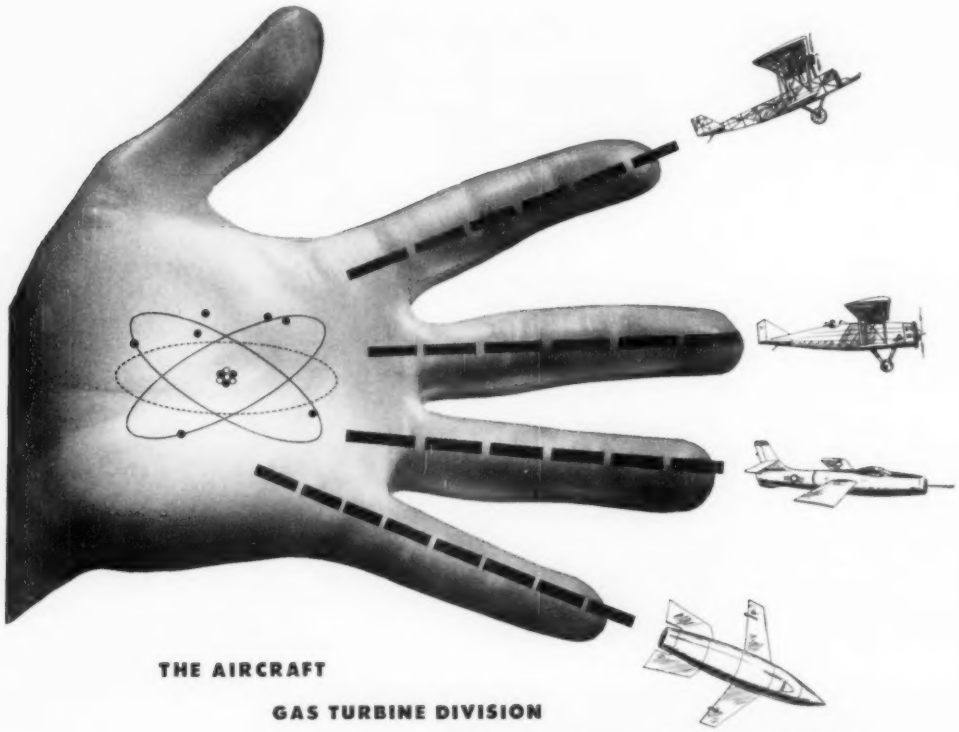

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GAS TURBINE DIVISION

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AERODYNAMICS	ANALYTICAL AND	ELECTRONICS
FLUID MECHANICS	EXPERIMENTAL NUCLEAR DEVELOPMENT	THERMODYNAMICS

Do not apply, please, if your best skills are being used for vital defense work

Positions available at West Lynn, Mass. and Lockland, Ohio.

Please Send Resume to:

Department T-1

Technical & Supervisory Personnel

AIRCRAFT GAS TURBINE DIVISION

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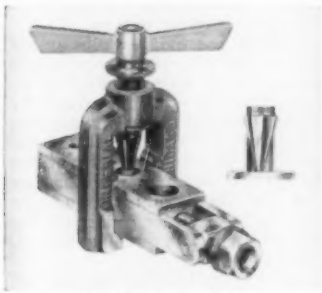
P.O. BOX 196 **CINCINNATI 15, OHIO**

NEW AVIATION PRODUCTS

Flaring Tool



Reaming Yoke and Bar

Tools for Tubes

Difficulties in working stainless steel tubing which have limited its use in aircraft are seen overcome with development of special metal working tools, according to the developer, Imperial Brass Mfg. Co.

The big advantage of the new tools is that they are manually operated and can be used in the field. This promises to broaden the possible uses of quarter-hard stainless tubing in aircraft hydraulic systems and other applications. Until this development, the use of aircraft grade, high-strength (for 3,000-psi. hydraulic systems) stainless steel tubing had been "deterred by the lack of tools which would satisfactorily flare and bend this tubing in field maintenance work," the firm says.

Successfully to flare, burr, bend and cut this tough metal with precision in the field, here is what Imperial offers:

• **Manual flaring tool** which makes 37-deg. flares in various sizes of tubing in conformance with Spec. AND 10061. This device rolls out the metal, is designed to provide a stronger flare than was possible previously. Original wall thickness is maintained at the base of

AMERICAN CHEMICAL PAINT COMPANY
AMBLER ACP PENNA.

Technical Service Data Sheet
Subject: PROTECTING ALUMINUM WITH ALODINE®

ALODIZING IS EASY AND EFFECTIVE

The Alodizing process is a chemical one and does not require electrolytic techniques or equipment. Alodizing is simple, foolproof, low in cost, and requires a minimum of equipment. Essentially, the process consists of the following easily controlled operations or steps:

1. Cleaning the work
2. Rinsing the cleaned aluminum surfaces
3. Coating with "Alodine"
4. Rinsing with clean water
5. Rinsing with acidulated water
6. Drying

After treatments. Alodized aluminum provides an ideal bonding surface for paint, wax, adhesive, or other organic finishes. These should be applied in accordance with the manufacturer's directions. Unpainted or exposed areas will be protected by the tough, durable "Alodine" surface.

Flight of the Chance Vought Cutlass, seventh in a line of outstanding fighters and "potentially capable" of flying faster than any other service type jet aircraft in production, land or carrier-based. Substantial surface areas of the Cutlass are constructed of painted Alodized aluminum.

SHORT COATING TIMES AND LOW BATH TEMPERATURES

With the "Alodine" bath at its normal temperature of 120° F., coating time by immersion approximates 1½ minutes and by spraying, 15 to 20 seconds. Coating times and bath temperatures can be varied to suit operating conditions.

"ALODINE" MEETS SERVICE SPECIFICATIONS

"Alodine" applied by immersion or spray complies with the rigid performance requirements of both industrial and Government specifications. The following is a list of Service Specifications which "Alodine" meets at the present time.

MIL-C-5541	U. S. Navord O.S. 675
MIL-S-5002	AN-C-170 (See MIL-C-5541)
AN-F-20	U.S.A. 72-53 (See AN-F-20)
	16E4 (SHIPS)

"ALODINE" HAS UNLIMITED APPLICATIONS

Parts can be treated by immersion, by spraying in an industrial washing machine, by flow coating, or by brushing. This means that "Alodine" can be used anywhere, on any part or product made of aluminum. This had led to widespread use of the Alodizing process: 1. by fabricators of aluminum products in all industries to assure the utmost in product protection and finish durability; 2. by manufacturers of aluminum who are supplying Alodized aluminum sheets and coils from the mills.

In general, small size products or parts are processed rapidly and conveniently in immersion equipment, which can be mechanized if production volume justifies it. For large production of formed parts, or for Alodizing coiled stock, strip, or cut-to-size sheets, a five-stage power spray washer is most convenient. Airplanes, trucks, trailers, housing, railway cars, bridges and other large units are Alodized in a simple brush-on or flow-coat process.

CHEMICALS ACP PROCESSES

WRITE FOR FURTHER INFORMATION ON "ALODINE" AND ON YOUR OWN ALUMINUM PROTECTION PROBLEMS.

CHEMICALS ACP PROCESSES

25 YEARS OF LEADERSHIP IN FASTENINGS OF STAINLESS STEEL
To YOU, Anti-Corrosive's 25th Anniversary is an assurance that the oldest, largest and best known firm dealing exclusively in stainless steel fastenings is best suited to serve your needs in this field.
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FREE - A - N Fastening Selector !
Write for handy slide Chart No. 52C — instantly identifies A-N Nos. pertaining to stainless fastenings, gives sizes, other data. Catalog available.
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1927 – 1952
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Manufacturers of STAINLESS STEEL FASTENINGS
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Working with your own design engineers, our specialists can help you with critical wave-guide castings, non-machinable alloys, and alloys for severe service conditions. Our techniques and plant are ultra-modern and are geared for high-speed production at low cost. How can we help you? Just tell us your problem—we'll do the rest.

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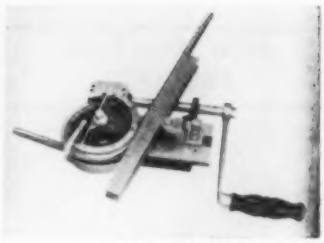
PRECISION CASTING CO. P. O. Box 628, NORRISTOWN, PA.



Tube Bender

the flare and work hardening is minimized, says the firm.

• **Manual bender,** for field bending of various sizes of tubing (MIL-T-6845), can be clamped in a vise, bolted to a bench or mounted on a tripod. It is packed in a metal kit, comes with necessary forming wheels and follow bars. The set is designed to prevent deformation of tubing, providing even, rounded bends with cross section and wall thickness not appreciably reduced.

• **A sawing vise** and new reaming and burring tool have been included. To make precision flares, Imperial points out, it is necessary that the ends of the tubing be cut and burred with precision beforehand. For various sizes, the sawing vise holds tube securely for making correct right-angle cuts with a standard hack saw. The deburring tool uses the same die holder as the flaring tool, but micrometer feed mechanism controls the cut.

The new tools also can be used with aluminum, titanium and other metals.

The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill.

Instrument Sliprings

A new subminiature slipring assembly designed for use in air navigation instrumentation is being produced by the Electro Tec Corp.

The assembly, incorporating 32 slip-rings with individual, color-coded leads, is said to combine minute size with high dimensional accuracy. Despite small size, the assembly easily meets 500-v. high-potential intercircuit insulation requirements, Electro Tec states.

The unit is produced by an exclusive method of machining the plastic blank to receive the silver rings which are electroplated into place. Its method, according to the firm, eliminates accumulated errors common to built-up assemblies. Rings are hard silver, are specially finished to prevent tarnish and minimize friction.

Overall length of the slipring assembly is 1.011 in. Individual rings measure: in width, 0.020 in.; in barrier width, 0.010 in., and in ring diameter, 0.141 in.

Electro Tec Corp., South Hackensack, N. J.

Float Nut Development

A new "Kaylock" floating anchor nut locknut so light in weight that in this respect it not only is sharply competitive with other two-part floating anchor nuts but with fixed anchors (single parts) as well, has been developed by Kaynar Mfg. Co.

In fact, says Kaynar, it is fully interchangeable with fixed anchor nuts in size, weight and strength. More than that: It is "lighter than its corresponding fixed anchor nut," the company claims. And the gap widens when comparing it with comparable floating nuts, according to the firm. In most popular sizes, it may weigh only ¼ as much.

Previously, the advantage of the floating feature (⅛-in. radial movement in this case) which permits wider tolerances and facilitates assembly, was gained at the expense of increased weight, size and lack of interchangeability. With its new floating nut, these drawbacks have been eliminated, says Kaynar.

In its plan view, the Kaylock floating nut is identical in outline and size with standard fixed anchor nuts of comparable thread size. Of tough, cadmium-plated, all spring steel construction for use at temperatures up to 550F, the part is built to meet strength and other requirements of Spec. AN-N-10a and AN-N-5b.

Kaynar Mfg. Co., Inc., Kaylock division, 820 E. 16 St., Los Angeles.

Metal Bond Agent

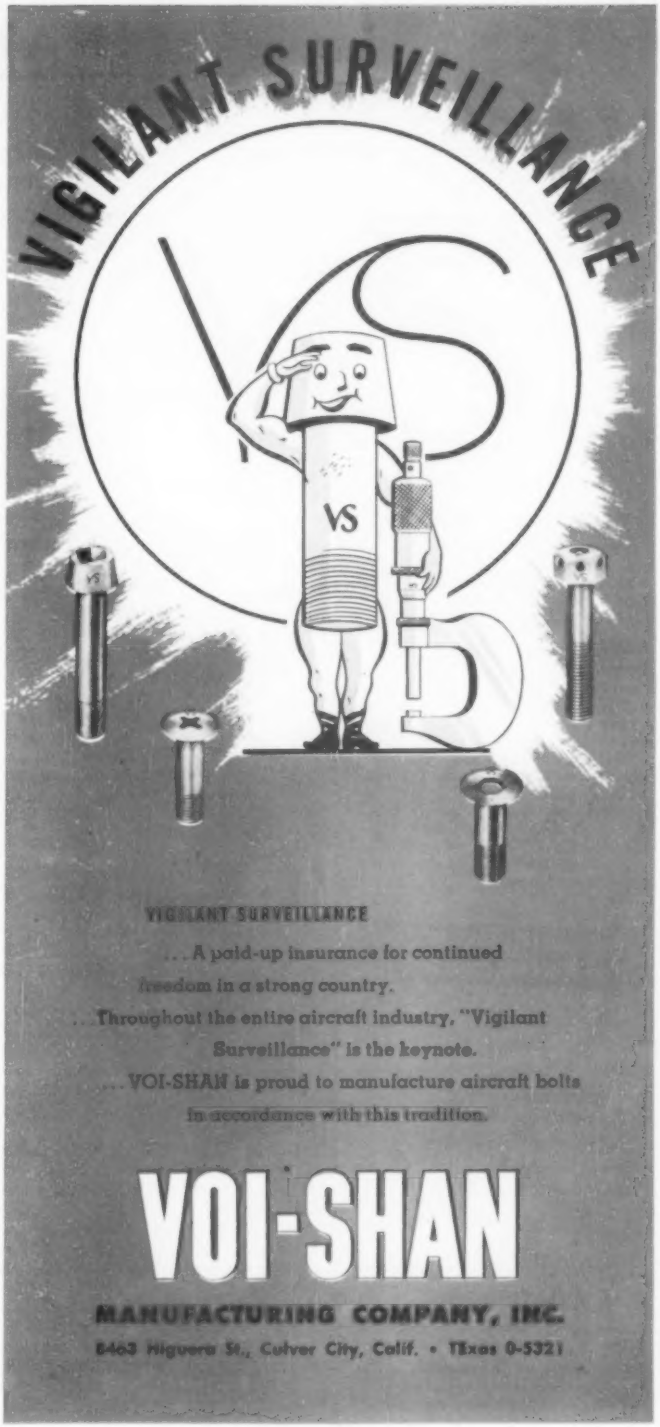
A new line of resin adhesives for joining aluminum alloy used in aircraft construction has been developed by the Ciba Co.

Ciba's engineers say the new adhesives are as strong as the sheet metal itself, permit lap joints as strong or stronger in shear than provided by spotwelding or riveting.

Adhesives being tested are based on the company's Araldite resins, all thermosetting compounds which cure without evolution of water or volatile matter at room or elevated temperatures. The adhesives are said to have high resistance to acids and alkalies.

They are credited with easing a number of difficulties encountered in bonding metallic to non-metallic materials and unlike metals to each other.

Ciba Co., Inc., Kimberton, Pa.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North American Has Built More Airplanes Than Any Other Company In The World

Engineering Personnel Office
Los Angeles International Airport
Los Angeles 45, Calif.; Columbus 16, Ohio

FINANCIAL

Profit Margins on Sales

	NET BEFORE TAXES, %		NET AFTER TAXES, %	
	1951	1950	1951	1950
BELL	7.8%	9.2%	2.4%	4.1%
CONVAIR	3.5	4.1	2.4	4.3
CURTISS-WRIGHT	8.5	10.0	3.9	5.4
DOUGLAS	8.3	10.2	3.1	5.6
FAIRCHILD	8.2	9.8	2.9	5.2
GRUMMAN	10.2	12.8	3.4	6.1
LOCKHEED	4.2	8.7	2.4	4.2
McDONNELL	10.7	12.4	4.9	7.3
NORTH AMERICAN	8.6	9.5	3.6	5.6
REPUBLIC	6.4	8.0	2.3	4.1
UNITED AIRCRAFT	7.7	10.6	3.4	4.9

Industry Profit Margin is Down

Aviation's average earnings rate of 2.2% after taxes compares with national manufacturing average of 6.2%.

A pronounced squeeze on aircraft profit margins is evident from an analysis of 1951 annual reports. Without exception, every company examined shows a lower rate of earnings on sales both before and after taxes. This is indicated in the accompanying table summarizing profit margins.

▶ **Special Conditions**—In addition to the trend toward lower profit margins prevalent in recent years, special conditions existing during 1951 served to reduce earnings even further.

• **Tooling-up.** In any large-scale expansion of aircraft production there is an unavoidably long preparation period during which tooling-up, training of personnel, and the assembly of materials and components must take place before volume output can result.

• **Shortages.** The difficulties normal to such preliminaries were compounded in 1951 by acute shortages of materials and machine tools. Bottlenecks in vital machine tools left their impact in the failure of key manufacturing processes to move as planned.

• **Strikes.** Direct and derivative labor troubles also had their effect. Strikes in aluminum plants, for instance, created shortages of raw materials which prevented production of jet engines on schedule. This, in turn, served to slow down the entire aircraft production schedule.

As a consequence, 1951 was an extremely disappointing year from the standpoint of aircraft production, deliveries and earnings. Estimates indicate that while industry sales were up about 20% over 1950, net profits were substantially lower for the group.

▶ **Net Range**—Net operating earnings before taxes range from a low of 3.5% for Convair to a high of 10.7% for McDonnell in 1951. The range in 1950 again starts with Convair at the low point—4.1%—and Grumman high at 12.8%. Pretax profit margins in 1950 were at a much higher level, however. In that year, eight of the 11 companies shown had pretax profit margins in excess of 9%; in 1951 only two went beyond that point.

Both Grumman and McDonnell show higher profit margins than the rest of the group. This may be a reflection of the incentive-type contracts peculiar to Navy aircraft procurement, which have been known to benefit both the manufacturer and the buyer. On the other hand, Convair's low profit margins are a direct attribute of the preponderance of its cost-plus-fixed-fee agreements, which greatly minimize the company's risk.

Most Air Force contracts are of the fixed-price type with price redetermination provisions. All funds recovered through price redetermination are again available for procurement and not returned to the Treasury, as prevails with recaptures under renegotiation. For this reason Air Force appears to prefer this type of agreement. But it also serves to keep profit margins down.

▶ **Tax Take**—To evaluate a company's earnings solely on a pretax basis is misleading. The contraction in profits after taxes becomes evident in the accompanying table. Most aircraft companies were subject to excess profits

taxes last year. As a consequence, Bell, for example, which showed a pretax profit margin of 7.8%, wound up with only a 2.4% ratio after taxes. Similar severe reductions are evident for the other companies during 1951.

While taxes also took a substantial bite in 1950's earnings, the cut was not so deep. The reduction in profit margins ran one-half of the pretax levels that year instead of by more than two-thirds in 1951. Convair was the exception, getting a 1950 tax refund.

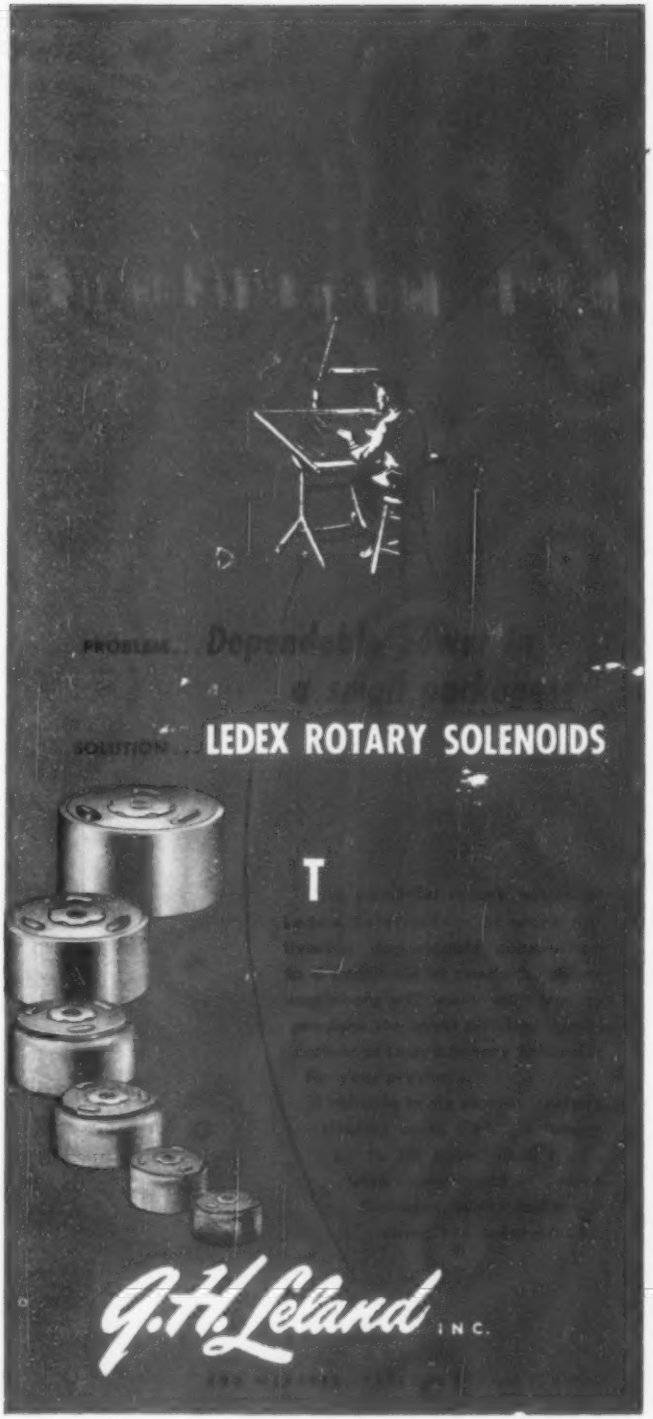
The profit margins after taxes for 1951 were at the lowest point in the aircraft industry's history. Only one company, McDonnell was able to wind up with a better than 4% rate.

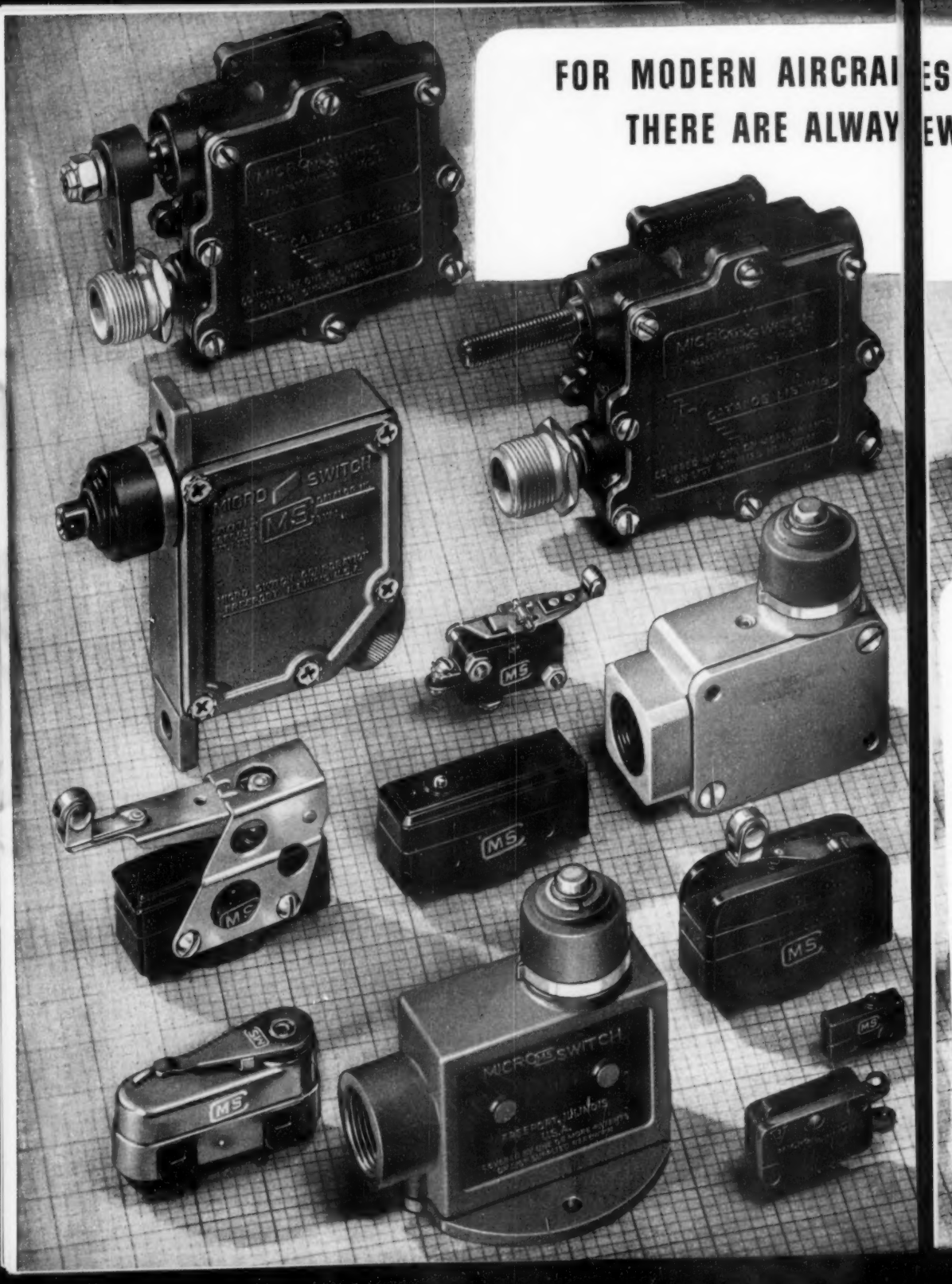
The individual experiences of the aircraft companies are substantiated by the annual compilations assembled by the National City Bank of New York. A current summary prepared by NCB shows that a group of 29 aircraft and parts companies had an average profit margin, after taxes, of 2.2% for 1951, compared with 4.5% for 1950. This list no doubt includes companies operating at a deficit. For example, the Glenn L. Martin Co.'s loss of more than $22 million pulled down the 1951 average. This group of 29 aircraft and parts companies show aggregate net profits, after taxes, of $57.6 million in 1951, down 32% from the $84.6 million recorded in 1950.

By contrast, the average profit margin for a group of 1,763 manufacturing companies, as revealed by the National City Bank study, was 6.2% for 1951, almost three times better than the aircraft experience. For 1950 the total manufacturing group showed an average profit margin of 7.7%.

From Another Angle—Another measure of profitability disclosed by the National City Bank review is that on "Book Net Assets," which may be construed as the investment. In this instance, the same 29 aircraft and parts units revealed a return averaging 8.9% for 1951 compared with 14.3% in 1950. The experience of all manufacturing companies disclosed an average 14.4% in 1951, 17.1% in 1950.

It is questionable, however, to apply earnings on the investment in the aircraft group without detailed qualifications. The extent of government-owned facilities leased to individual companies may afford increased production capacity without a corresponding investment. Further, capital investments representing plant facilities which have long been outmoded but are still retained on the books distort the measure of earnings when applied on this basis. Modern replacements entail a far more substantial capital outlay and also lead to improved efficiency and lower costs.—**Selig Altschul**

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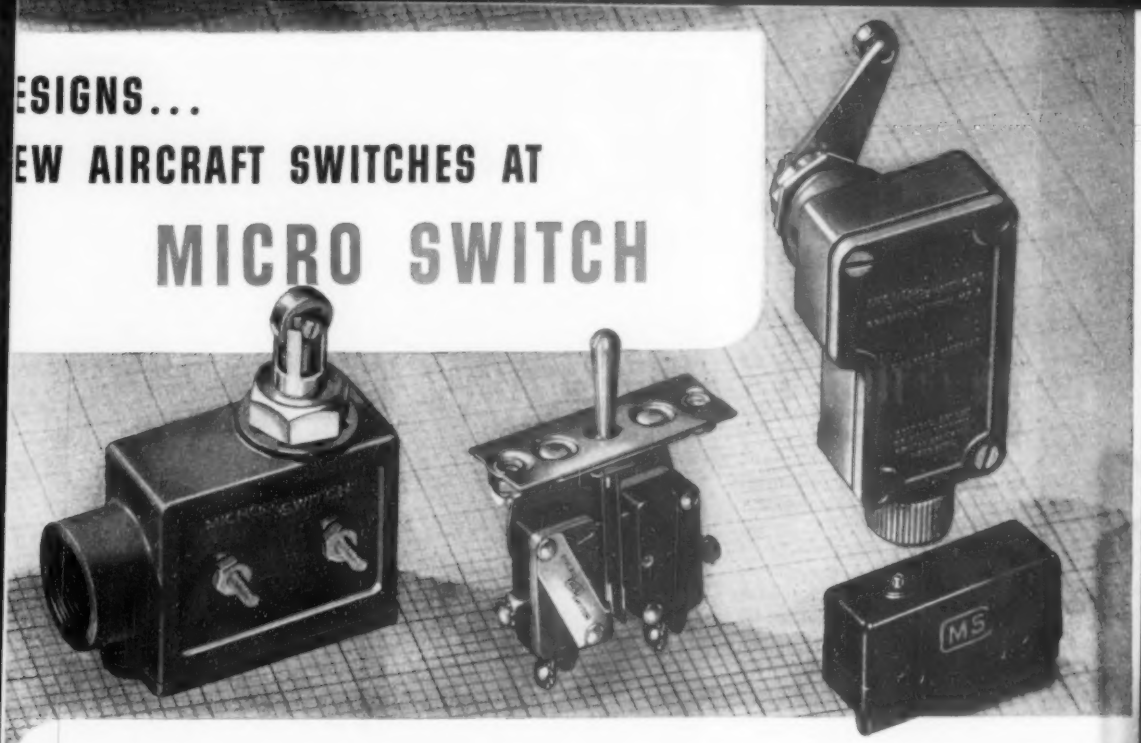

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LETTERS

Let's Stress Safety

The dust has settled a little on the Elizabeth problem and its aftermath, although I hope only the hysteria has gone out of it—not serious seeking for a solution. This letter is being addressed to you because I have often felt that AVIATION WEEK holds an unusual position regarding the proper aims and policies of the aviation industry. . . .

All the competitive advertising, safety statistics and loss of temper about the railroads don't change the fact that people do get killed in (and now by) airplanes, and too frequently for reasons that today are inadequate. . . .

Maybe you haven't noticed this fact: No air carrier, domestic or foreign, regular or irregular, major or minor, has a vice-president or other top executive whose title contains the word "SAFETY."

It has been said that the word is the index of the mind. Assuming this has a grain of truth, isn't the connection suggestive? Hasn't the industry's policy of avoiding accident publicity perhaps been carried too far? Might it not have been wise, instead of beefing about the consolidation in 1940 of the CAA and CAB, for some one of aviation's big people to have demonstrated the free enterprise system by creating a safety job?

There has been an awful lot in print in my lifetime about how "the average person" just doesn't understand air accidents. We have played air safety close to the vest; it has not been a public problem, but a private one, discussed and dealt with by a very small group of professionals.

Now, I think it's a very healthy thing that plain people are involved in air safety. Our explanations haven't been understood in the past, and we are going to repent the fact that we have to justify our operations to people who don't know one end of an airplane from another. But if we get pressured into avoiding accidents—and I think they can be avoided—we won't have to put up with people who "don't understand."

ROBERT BLODGET
13 Sharp Hill Road
Wilton, Conn.

How Many Viscounts?

Your issue Jan. 21 incorrectly stated that 40 Viscount airliners on order for British European Airways would use 215 lb. rocket assistance for takeoff in tropical climate and high altitude.

In view of the wide readership of your paper, this report has led to misunderstanding, and your London Office suggested that we should write to you direct with a view to your publishing a correction. The position on Viscount sales at the moment is that we have sold 20 to British European Airways, 12 to Air France, and 4 to Aer Lingus. First reports of the BEA contract mentioned a figure of 28 and it is possible that the Corporation will eventually take more than 20.

There is no question of the Viscount needing rocket assistance for takeoff, even under tropical or high altitude conditions. In the course of its recent tropical trials in Africa water methanol injection was used with complete success. We hope to be able to supply you with the full report on these trials within the course of the next fortnight.

If there is any further information you require on the subject, we should be grateful if you would let use know.

JACK L. VOSPER
Vickers Limited
Vickers House
Broadway, Westminster, London S. W. 1

Aro Confusion

This letter is written in behalf of our client, Aro Equipment Corp., Bryan, Ohio. In the Mar. 31 issue of AVIATION WEEK under the section, "Washington Roundup," an item appeared about a company known as Aro. Also in your Apr. 14 issue another item appeared in connection with this same company. Because of the similarity of names considerable embarrassment has been experienced by The Aro Equipment Corp., originating from shareholders, customers, etc. The intensity of the situation has been increased for the reason that The Aro Equipment Corp., produces products for the aviation industry. As a matter of fact, back issues will indicate that our client has advertised in your magazine.

It will be our intention, of course, to advise shareholders and customers of this situation but our efforts to clarify the matter would be greatly helped if your publication included in an early issue a clarification of this matter because The Aro Equipment Corp. is in no way connected with the ARO Company which you refer to.

HENRY F. REUTER
Reuter & Bragdon, Inc.
610 Wood St.
Pittsburgh 22, Pa.

Knots and Mph.

Ever since Capt. R. C. Robson's column has been appearing in AVIATION WEEK, I have been reading it avidly, usually punctuating his remarks with "hear, hear."

Capt. Robson's latest thesis that "We must simplify aviation," appearing Mar. 10, should certainly rate a strong vote from everyone. However, Capt. Robson indicates in his comments about nautical miles and knots that he didn't recognize a simplification when it was staring him in the face.

What could be simpler than eliminating a purely arbitrary unit of measurement and settling on one which is related to another of the navigator's units, a degree of latitude (60 nautical miles = 1 degree of latitude)?

In the past, many units have been in use on aviation charts: statute miles, nautical miles, and kilometers on some European charts. Standardizing this hodgepodge is simplification, so the logical unit to standardize on is the unit with some meaning, rather than one of the arbitrary measurements.

As for Capt. Robson's objection to a "foreign language" and "an extra mental calculation," it is my understanding that shortly all CAA, Air Force, and Navy charts will be in nautical miles.

Where is the "extra mental calculation"? His comments concerning airspeed errors in approach for landing holds no water, since an airspeed indicator is no less accurate because it is calibrated in knots rather than statute mph.

There should be no more problem for a pilot to memorize the critical speeds of his airplane in knots than it was for him to memorize them originally in mph. when he checked out in the plane in the first place. Perhaps Capt. Robson can set his mind at ease about those stalling speeds if he realizes that in watching an airspeed indicator calibrated in knots and remembering an mph. stalling speed he is on the safe side. If he had learned his stalling speeds in knots and then were confronted with an mph. gauge he could readily get into trouble.

All things considered, it appears to this pilot, who has used both units, that in settling on nautical miles as a standard we have not only simplified, but taken the only logical step.

LT. COMDR. HARVEY C. PAIGE
Commander, Fleet Logistic Air Wing,
Atlantic/Continental
NAS, Patuxent River, Md.

Aiding Handicapped

I think your recent article on employment of handicapped people by Bell Aircraft is a fine thing. Being a handicapped person myself I have a keen interest not only in what organizations like Bell are doing in this field but also I am very appreciative of the kind of publicity you have seen fit to give this.

I have passed several copies to friends working in physical and vocational rehabilitation here in California. I know they will be very interested and appreciative also.

TOM CARMODY
McGraw-Hill Publishing Co.
San Francisco, Calif.

The 'Inventory'

I have just gotten a copy of the "Inventory of Air Power." Anything I might say would be repetitive of what I have been moved to say in previous years—except that this year it is, if anything, bigger and better.

S. RALPH COHEN,
Public Relations Officer
International Air Transport Assn.
International Aviation Building
Montreal 3, Canada

(The letter above is typical of many complimentary letters we have received from readers on AVIATION WEEK's *special issue Feb. 25—ED.)*

Elizabeth

I wanted to congratulate you on your handling of the Elizabeth accident in the Feb. 18 issue. I was particularly interested in the material in the box and its statement of the number of needless operations over Elizabeth.

JOHN H. GEISSE
3350 Tennyson St., N.W.
Washington 15, D. C.

Sixth '52 Crash Spurs New Safety Pleas

- **Pilots press for drastic action to improve worsening situation; CAB delays action on recommendations.**
- **But Board grounds Robin Airlines following C-46 crash; company had 40 alleged safety violations.**

On the same day (April 18) that CAB proposed a regulation to raise pilot-training standards of some nonscheduled airlines, a nonsked C-46 crashed into the top of a fog-shrouded Los Angeles hill, killing all 29 abroad.

It was the third fatal airline crash this month, the sixth since Jan. 1 and the twelfth in six months.

But it was the year's first fatal crash for the nonskeds. It brought their fatality rate from zero to an estimated 11.5 per 100 million passenger miles flown to date, compared with 7.8 for the full year 1951.

CAA Administrator Charles Horne suspended operating rights of the nonsked operator—Robin Airlines. And he asked CAB to revoke Robin's registration permanently. The plane involved apparently was lost when it crashed. It belonged to Robin, which was doing business on this flight as North Continent Airline, CAA said. Administrator Horne said Robin had previously been cited for about 40 alleged violations of safety regulations.

▶ **More Drastic Action**—Meanwhile the Pan American DC-4 crash of the week before brought the scheduled airline fatality rate to an estimated 2.4 per 100 million passenger miles, (excluding Northwest's Pacific airlift charter crash), compared with 1.3 for all of 1951.

Air Line Pilots Assn. representatives told AVIATION WEEK they have recently pushed for more drastic action to improve the apparently worsening safety situation on all types of airlines.

But a check by AVIATION WEEK revealed that as of last week the new nonsked pilot regulation was the only important change that CAB's Safety Investigation Bureau had planned.

Yet even before the Pan American loss of 52 passengers in the DC-4 water landing off San Juan this month, ALPA had asked CAB to make the airlines install more adequate life rafts and other survival equipment on transports making overwater flights. In the two water landings so far this year by airlines (Northwest and Pan American), 88 persons have died of drowning or freezing in the water while a few apparently were injured during the actual landing.

▶ **No Improvement**—But CAB safety regulation chief John Chamberlain said last week that he isn't considering any new regulation such as the pilot-proposed improvement in "ditching" equipment.

Civil Aeronautics Board generally enacts new safety regulations; Civil Aeronautics Administration interprets and enforces them. Also, CAA collects most of the safety data with its field organization, and generally proposes regulations for CAB adoption. But the ultimate authority on making safety regulations is the Board.

▶ **Proposed CAB Safety Regulations**—Chamberlain says the Board has proposed more emergency exists for new plane types—but none for present transports, as cost of modification of existing types is high. Also, he says, the Board has proposed more exits to accompany any further increase in aircoach seats beyond presently approved seating arrangments.

However, DC-4s already are flying with up to 79 passengers, DC-6Bs with 82 and Constellations with 83. There appears to be no existing or proposed regulation that would require more emergency exits or more life raft equipment on any transport in the foreseeable future.

Another recent pilot-proposed safety move is an anti-prop reversal safety device to avoid inadverent prop reversal during flight. This device (AVIATION WEEK Apr. 14, p. 84) was slated for tests at Hamilton Standard this month. But recent reports indicate that the propeller company's test-stand runs are booked up for a while, and CAA is not much interested in the proposal.

The pilots report that since the National crash from prop reversal at Elizabeth, N. J., in February, American has experienced two and PanAm one inadvertent prop reversal.

▶ **Nonsked Regulation**—Here are details of the new CAB-proposed regulation of nonscheduled airline pilot training—also stemming from evidence gleaned in investigation of some recent crashes.

Each nonsked or other operator (such as cargo airline) under Part 42 of the Civil Air Regulations must:

• **Designate a check pilot** who must be responsible for proper checking of pilot qualifications. Most big nonsked operators already have such a check pilot, but smaller operators sometimes check their pilots through another airline or even hire pilots for a day or so without demanding they meet check up requirements at all, CAB says. Now one pilot of every operator, no matter how small, must be responsible for proper check on pilot qualifications.

• **Designate a chief pilot** responsible that no individual is assigned as a pilot unless he has met all requirements of Civil Air Regulations. Pilots have always had to be CAA-qualified, but on small nonsked operations there sometimes was no one specifically charged with making sure the hired pilots were qualified.

On a small line, the check pilot and chief pilot may be the same man.

• **Written pilot examinations** must be submitted by the operator to the pilots before they can be assigned work. Exams must include the company operations manual and instrument approach and navigation on routes to be flown.

Meanwhile, CAA has stepped up inspections of nonscheduled lines to make sure they meet existing maintenance and pilot-qualification standards.

▶ **Robin's Record**—The last time Robin Airlines was in the crash news was last Dec. 20, when a Robin C-46 got lost and ended up in a forced landing near Coburg, Ontario.

On Mar. 21, CAA asked CAB to start procedings to revoke Robin's operating certificate. CAA cited about 10 counts of safety violations at that time—most of them in connection with the Coburg crash. CAA last week filed supplementary charges in Los Angeles.

Counts in the original CAA move of last month included: pilots not listed on flight roster, not properly trained in plane type or instrument procedure or night landings, distributing fuel out of balance, and failing to file flight manifest on the Coburg flight. CAA also cited another recent Robin flight on which pilots were at the controls over the 8-hour limit without rest.

▶ **Recent Crash Causes**—Of the 12 fatal crashes the last six months, five were probably contributed to by engine failure, one by inadvertent prop reversal,

four by bad navigation under instrument flight conditions, two by stall and one by collision.

Engine failure probably contributed to the San Juan DC-4 crash of Pan American; the Jamaica, N. Y. C-46 crash of U. S. Airlines; the Sand Spit, B.C. DC-4 crash of Northwest, and the Elizabeth, N. J., C-46 crash of Miami Airlines. Prop reversal probably caused the Elizabeth, N. J., DC-6 crash of National. Navigation apparently caused the Los Angeles C-46 crash of Robin Airlines; the Fairbanks C-46 crash of Transocean; the Little Valley, N. Y., C-46 crash of Continental Charters; and the Tucumcari, Ariz., 2-0-2 crash of Transocean. A stall for unknown reason may have caused the Elizabeth, N. J., Convair crash of American; a stall and spin from which there was no recovery caused the Denver DC-3 crash of United. And in-flight collision caused the Oakland DC-4 crash of Overseas National.

Thus, engine failure and navigation —sometimes a combination of the two —continue to cause most crashes, with stalls given as the third most frequent cause.

Details of Recent Fatal Crashes

Here are the causes and circumstances of the six fatal airline crashes to date this year, followed by an updating on late 1951 crashes similarly briefed in AVIATION WEEK Jan. 14, p. 13:

• **Sand Spit, B. C.** Northwest Airlines operating TWA DC-4 on Jan. 19 settled into water 4,500 ft. beyond emergency airport on which pilot touched down with one engine out, then took off again half way down the runway. Three crew and 33 passengers died of exposure and drowning, seven survived after the crash of this Pacific airlift military charter flight.

CAB and pilot investigators say the plane apparently developed insufficient power to continue climb-out. Cause of most deaths was unavailability of life rafts and other ditching equipment such as flashlights, according to CAB and pilot investigators reporting on the crash.

ALPA recommended at the CAB accident hearing that rafts and equipment be available from outside the cabin, as with some Navy and Air Force planes.

• **Elizabeth, N. J.** National Airlines DC-6 on Feb. 11 crashed into field and buildings shortly after night takeoff from Newark Airport. Three crew, 25 passengers and four residents were killed, with 25 survivors on this scheduled passenger flight. Caused by inadvertent reversal of one prop while another prop was feathered, CAB investigators say. National has temporarily banned use of prop reversal and has wired around the circuits which are involved.

• **Elizabeth, N. J.** American Airlines Convair on Feb. 22 plunged into building during instrument approach to Newark Airport. Three crew, 20 passengsrs and seven residents killed on this scheduled passenger flight. Cause believed stall, possibly contributed to by engine failure, CAB investigators report.

CAA ordered re-wiring of prop reversal electrical circuit, although there's no evidence reversal wiring caused the Convair crash.

CAA started a government-industry study of how to prevent inadvertent prop reversal.

Air Line Pilots Assn. came up with a prop reversal prevention method now being tried by Hamilton Standard (AVIATION WEEK Apr. 14, p. 84).

• **Jamaica, New York City.** U. S. Airlines C-46F on Apr. 5 crashed into lot and buildings four miles north of Idlewild Airport after missed approach. Two crew and three residents killed on this scheduled cargo flight. CAB investigators last week were checking to see if a broken carburetor diaphragm found in one engine could have caused enough power loss to cause the crash. Some witnesses reported they heard power surges.

• **San Juan, Puerto Rico.** Pan American DC-4 on Apr. 11 landed in water five miles from San Juan with one engine out and feathered and another engine on the same side almost dead. Fifty-two passengers died, 17 survived on this scheduled over-water flight. Cause of engine failures probably undeterminable as plane sank in 1,800 ft. of water. Believed passenger panic prevented orderly exit during the three minutes the plane floated.

Last Quarter, 1951

• **Tucumcari, Ariz.** Transocean 2-0-2 on Nov. 5 flew into ground before reaching runway during instrument approach. One passenger killed on this nonsked airline charter flight. Cause was believed to be pilot's trying to land below minimum weather (reported near zero-zero) after overflying Albuquerque, which had reported clear with bad weather ahead.

• **Oakland, Calif.** Overseas National Airlines DC-4 on Nov. 16 fell to earth after losing tail in collision with California Eastern DC-4 as both planes converged over radio cone doing instrument approach training. The crew killed in this nonsked instrument training flight. Cause believed to be improper lookout of safety check pilot, contributed to by fact both planes were using old-type canvas hood over trainee making visibility impossible for him and half-blind for check pilots.

• **Denver, Colo.** United Air Lines DC-3 on Dec. 4 plunged to earth. Three crew killed on this scheduled airline training flight. Cause was reported as a stall and spin from which there was no recovery for unknown reason. United instituted a more definite and conservative instruction procedure for check flights.

• **Elizabeth, N. J.** Miami Airlines C-46 on Dec. 16 plunged to earth shortly after takeoff from Newark Airport. Four crew and 52 passengers killed on this nonsked passenger flight. CAB analyzes the cause as a stall contributed to by heavy load, power loss from engine fire, wheels-down drag and fact pilot was low over densely populated part of city and could find no place to land.

• **Little Valley, N. Y.** Continental Charters C-46 on Dec. 29 flew into mountain. Five crew and 21 passengers killed, 24 survivors, in this nonsked passenger flight. CAB finds cause was pilot error in continuing visual flight during instrument weather at night.

CAA further increased intensity of C-46 maintenance inspections and cut allowable gross weight of the C-46 to 45,000 lb., although this crash apparently was not caused by bad maintenance or overloading.

• **Fairbanks, Alaska.** Transocean Air Lines C-46 on Dec. 31 flew into mountain during instrument procedure approach. Two crew and two passengers killed on this nonsked charter flight. Cause, believed by CAB investigators, was bad instrument approach procedure by pilot.

Canada Approves Cargo Airline

Dorval Air Transport Ltd., Montreal, has been licensed as the first all-cargo airline in Canada by the Air Transport Board, Ottawa. DAT will operate Curtiss C-46 Commando freighters and is free to work in Canada and to overseas points.

Dorval Air Transport was to get its first C-46 by the end of March.

CAP Leases Airport

Congressional Airport, near Washington, D. C., well-known 200-acre private flying field, was leased Apr. 1 by its operator, Arthur Hyde, to the Washington Civil Air Patrol wing for a year and will be operated by the wing as a CAP base. Hyde continues to operate Hyde Field at Clinton, Md.

Locals Ask Increase in Mail Pay

Pioneer says it needs more income to operate 2-0-2s: All-American, Robinson, Southwest also ask increases.

Four local service airlines—All-American, Pioneer, Robinson and Southwest—have asked CAB to increase their permanent mail rates this year because of rising costs.

Pioneer makes a special plea for added mail pay to cover the initially higher expense of operating nine Martin 2-0-2s bought to replace its 11 DC-3s. Pioneer, which also has ordered five Convair 340s for 1954 delivery, becomes the first local service carrier to introduce modern, high-powered aircraft.

Total cost of the nine Pioneer Martins and five Convairs is about $8½ million. Pioneer has sold its 11 DC-3s to Air Force for $1.1 million. Pioneer bought them as cargo-carrying C-47s from the War Assets Administration in 1946 for $192,000 but claims the cost of overhauling and converting them ran the total bill up to about $1 million.

Pioneer President Robert J. Smith says the nine Martins that start flying this June will get the same service frequency as the DC-3s. And "looking to the future when Pioneer will need supplemental equipment, we have decided to purchase the five Convair 340s for delivery beginning in January, 1954," Smith says.

Pioneer's Martins will seat 36 passengers, the Convairs 44.

► **What They Want**—Here's a rundown on the mail pay increase petitions:

• **Pioneer.** Pioneer's petition is double-barreled. First they ask a one-cent raise in effective rate for the DC-3 operation to June. Company says higher costs mean the present rate of 27.58 cents a revenue mile would result in a net loss of $26,196 for the calendar year. Pioneer asks a 28.50-cent rate based on DC-3 operation.

Then Pioneer goes on to say that introduction of the 2-0-2s will raise expenses more than revenues at first, but doesn't say how much—merely asks the Board to consider a higher rate to cover higher initial cost of the Martin operation.

In its SEC registration for financing the new equipment, Pioneer estimated that the first two years of Martin operation would require increased mail pay; the third year would be more economical than the DC-3 operation; and by the end of the fourth year (June, 1956) the cumulative mail pay requirement would be less than if the conversion to the Martin and Convair fleet had not been made.

CAB has ordered an expedited formal hearing on Pioneer's case. Pre-hearing conference date was programmed for Apr. 23.

• **All-American.** AAA petitioned CAB Feb. 8 for an effective mail rate increase of about 25%—from the estimated present 1952 rate of 42 cents a plane mile to 52 cents. Effective rate last year was about 49 cents a mile.

All-American President Robert Love recently told CAB that if he doesn't get route extensions he asks for, All-American might as well close down the business. Last year, Love offered to sell his controlling stock interest in the company, but later withdrew the offer.

Some All-American pilots ascribe part of the line's difficulties to basing its maintenance and management at expensive quarters in Washington National Airport instead of Pittsburgh, major hub of the company's Middle-Atlantic States route system.

• **Robinson.** in its most recent petition amendment, asks enough mail pay increase to give a fair return above the presently-estimated break-even rate of 42 cents a revenue mile. Effective mail rate right now is about 35¼ cents.

Robinson first asked an increase on Feb. 16 based on its bad weather losses last winter. Robinson also asked compensation for losses from the Newark Airport closing. But the Board pointed out that a final mail rate makes retroactive adjustment impossible. All an airline can do is challenge the present rate as it applies to the future, CAB told Robinson. So Robinson now has come in with the amendment to its petition.

• **Southwest** only a year ago voluntarily asked for a cut in mail pay. But now Southwest says cost increases force it to ask CAB for a 70% increase in effective mail pay. Actually, this is from a 1951 and presently estimated effective rate of 30.30 cents a mile to an estimated need of 51.70 cents. The 51.70-cent rate is about in line with what other established locals are asking.

Board Approves Airline Wage Hikes

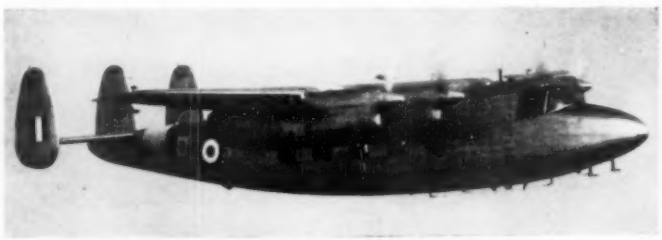
Wage stabilizers say pay increases they've approved for airline ground personnel are mostly lower than allowed under the 10% and cost-of-living formulas. But pilots and cargo and feeder airline ground personnel raises have been allowed to exceed the stabilization formula.

This is disclosed by Chairman Nelson M. Bortz in a report covering the first six months, ending Mar. 31, of the operations of the Railroad and Airline Wage Board. RAWB received 172 applications from airlines for approval of wage adjustments and disposed of 105, leaving a balance of 67 on hand on Apr. 1.

New wage contracts giving increases of 11-14% to pilots and instituting a flight pay formula for copilots on almost all domestic airlines have been approved by RAWB. The Board let the increase pierce the ceiling because of the obsolete pay structure for pilots and copilots.

Above-ceiling increases were approved for employes of smaller "feeder lines" and cargo carriers because their operations have expanded substantially since 1949, the report said.

Varying adjustments have been approved for other flight personnel, including stewardesses and flight engineers.



RAF ORDERS 30 MARATHONS

Handley Page (Reading) has received an RAF contract for 30 four-engine Marathons similar to the one pictured above for use as advanced-navigation trainers. Initial deliveries are to be made in three months. Range will be sufficient to permit training flights from Britain to Malta and Gibraltar. Handley Page also has received orders for airliner versions from Union of Burma Airways (three) and West African Airways Corp. (four). The plane has a tricycle landing gear, is powered by DH Gipsy Queen engines of 340 hp. each, giving a top speed of over 200 mph. and 1,400-mi. range. A modified version has two Armstrong Siddeley Mamba turboprop engines.

American to Drop Block Ticket Plan

American Airlines plans to drop its year-old "block ticket plan," under which American sells blocks of tickets to large organizations for re-issue individually to personnel.

American has told Civil Aeronautics Board it would rather drop the system than fight a lengthy proceeding before the Board against complaints of Eastern, United and the travel agents. The complainants got CAB to start an investigation of whether the system is "discriminatory."

American will drop the program this month if CAB will close the case.

The complaining airlines claimed the system gives American an "unfair advantage" when a company travel department holds a block of tickets for issue as demand arises. American said it was just another sales stimulant, and any airline could do it.

But an American official says the airline salesmen can't work hard to sell the block ticket system when it may be canceled anyway. So, rather than continue half-heartedly under this burden and the added expense of the proceeding itself, American is ready to quit.

CAB had asked the complaining lines to arbitrate the issue as provided in interline agreements. But the lines persisted in carrying it to CAB. So the Board opened the investigation—reluctantly, American says.

Now, if the lines and CAB drop the matter, the "block ticket plan" probably will die, at least for the present.

Brazil's Traffic

(*McGraw-Hill World News*)

Rio de Janeiro—Air transport statistics covering activity at the 36 top-ranking airports in Brazil during 1951 show that 1,672,941 passengers disembarked and 1,674,114 took off.

Incoming airmail topped domestic airmail. The figures: 2,197,441 lb. and 1,943,766 lb. respectively. Air cargo loaded in Brazil weighed 87,714,088 lb., 98,718,193 lb. were unloaded.

The busiest fields, in order of traffic, were: Sao Paulo, Rio de Janeiro, Belo Horizonte, Porto Alegre, Curitiba, Salvador and Recife.

Air Travel Up in Hawaii

The Hawaii Aeronautics Commission reports an 11.7% increase in inter-island air travel among the six principal islands of the Hawaiian chain in 1951.

There were 490,490 passengers compared with 438,938 in 1950.

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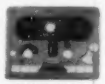

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Another Nonsked Halted by CAB

In a 4-to-1 decision the Civil Aeronautics Board has suspended civil airline operation of American Air Transport, a nonscheduled operator. The Board suspended AAT's letter of registration, except for military flights, because it flew more frequently and regularly than CAB's present economic regulations permit for "large irregular carriers."

AAT flew between Miami and Newark about five times a week.

CAB Member Joseph P. Adams dissented, primarily on grounds that immediate suspension is not required by the public interest. Adams recommended that AAT be permitted to operate on reduced frequency until the Board makes final decision on its move to revoke AAT's registration.

► **Didn't Take "No"**—The Board order points out that AAT continued operation after the Board issued a cease-and-desist order. That makes AAT's conduct "intentional and flagrant," the Board majority says . . . "Unless we suspend its letter of registration, the carrier will continue flagrantly to violate the Civil Aeronautics Act . . . our failure to suspend at this time would encourage similar violations by other irregular carriers."

The majority rejects AAT's contention that its carriage of 32,000 Miami-bound passengers a year provides a useful service and that in the absence of proof that the public interest is not served by the carrier there can be no suspension.

The Board answered the "public service" argument by stating: "In the event that any lack of service is brought to our attention, we have ample means available for remedying the situation."

► **But When?**—But Joseph Adams says, "A careful search of the record fails to reveal a single instance in the Board's history . . . where this Board has ordered a certificated carrier to meet a demonstrated need for service. . . ."

Adams concludes his dissent by criticizing the majority for basing its decision on "a short-range basis, characterized by an over-weening desire to 'regulate' rather than to 'promote and develop' our air transportation system."

Lansa Profit

(McGraw-Hill World News)

Bogota—A profit of approximately $54,500 has been recorded by Lineas Aereas Nacionales Consolidadas (Lansa) during the three months October through December, 1951, against monthly losses of $20,000 prior to the carrier's merger with Avianca.

SHORTLINES

▶ **Air Coach Transport Assn.** has called a special membership meeting May 5-7. Three major subjects: nonscheduled airline participation in Air Force mobilization program for airlines; CAB economic investigation of nonsked place in commercial air transport, and renewal of the military traffic agreement that expires June 30.

▶ **Air Line Pilots Assn.** reprints in the March "Air Line Pilot" a paper by Dr. Ross A. McFarland citing evidence that age is relatively unimportant in judging pilot capabilities of a man in good health. Some 20% of airline pilots were over 40 in 1950. "At present we do not know how long pilots will be able to fly," he concludes.

▶ **KLM Royal Dutch Airlines** is slated to get first of nine 13,000-hp. Super Constellations from Lockheed late this year. This will be the first compound-engine commercial airliner. (Lockheed now has a half-million sq. ft. of floor space devoted to Super Connie production—is building toward a three-shift operation before year-end.)

▶ **National Air Freight Corp.** denial of a letter of registration by CAB is upheld by U. S. Court of Appeals, D. C.; court agreed with CAB that NAFC is controlled by surface transport companies.

▶ **Northwest Airlines** has been forced to reduce schedules temporarily because of flood damage to its overhaul facilities at St. Paul.

▶ **Sabena,** Belgian airline, has CAA certification as an approved repair station for maintenance of U. S. planes.

▶ **Scandinavian Airlines System** has its U. S. foreign air carrier permit renewed by CAB for an indefinite period, serving New York, Chicago and Scandinavia.

▶ **Slick Airways** reports March air freight volume of 6,172,712 ton-miles, up 9% over a year ago. Load factor was 81%. Slick attributes the increase to shipments of heavy machinery going uncrated via Slick.

▶ **United Air Lines** reports a record March, with 169,194,000 revenue passenger miles—up 20% from a year ago. Upturn from Feb. is 15% for passenger traffic.

▶ **U. S. Chamber of Commerce** finds that the transportation industry paid $2¼ billion in 1951 taxes—more than double industry earnings of about $1.2 billion.

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LETTER ON CAA

Burlesque in Three Acts

(This open letter to the Director and Deputy Director of CAA's Office of Aviation Safety was written by an employe of that office, who has watched from the inside how some of CAA's notorious Old Guard bureaucrats have maneuvered for power and position the past ten years. Much of this information checks closely with this editor's own daily experience in Washington from 1938 through 1949. It is time that more of the inner workings of CAA's Old Guard are fully exposed—their shoddy manipulations, their inadequacies, their insincere motives, and their subservience of public welfare to their own selfish interests. The writer of this letter is one of hundreds of conscientious employes in the Office of Aviation Safety who once had respect for their jobs and would like to regain that respect, and work wholeheartedly to save human lives. We think this story is revealing. We also repeat, to those who disagree, that we offer them space for rebuttal, to print "the other side."—R.H.W.)

Prologue

Mr. Heusley and Mr. Davis:

Your letter of Mar. 21 was published in accordance with your request, without additions or deletions, and with prominence in AVIATION WEEK Mar. 31. Your letter is an insult to the intelligence of the aviation public, the industry, the professional pilots, and the majority of people in CAA.

I understand that AVIATION WEEK intends to continue to solicit and publish factual information concerning your past handling of vital safety matters, and let others draw their own conclusions concerning your "personal and professional character, integrity and honesty," as well as your technical competency.

If AVIATION WEEK's editorials are "distorted" you doubtless know your rights. However, when did it become a "deplorable disservice" to the public to disclose the full story on any issue?

You say your letter puts forth "the facts." Actually, you have described only the last act of a three-act burlesque which has played during the past six years.

Perhaps you have forgotten the preceding acts, so let us refresh your memory, with a brief resume in plain English, avoiding all governmentese. To us, governmentese is difficult of understanding and impossible of composition.

ACT I

In 1945, when Mr. T. P. Wright became Administrator, the airline industry requested him to divorce Air Carrier Inspection from the regions, reestablish it on a systemwide basis with one competent Chief Inspector in charge of inspection over each individual airline.

The Chief Inspector was to have such assistants as he needed, based at those strategic points that would best facilitate accomplishment of thorough inspection.

The Chief Inspector was to report to a headquarters, and was to have a large measure of both responsibility and authority over the airline to which he was assigned.

The headquarters office was to issue policy for guidance of both the inspectors and the airlines, and was to insure uniform inspection and application of policies to all airlines.

This seemed to be a simple, workable setup and the request was considered to be a reasonable one by Mr. Wright. He asked the Director of Safety Regulations, Chief of Air Carrier Inspection and the Regional Administrators for recommendations.

The Chief of Air Carrier Division recommended the plan as very superior to the regional setup in effect, but the Director of Safety Regulation and the Regional Administrators all recommended that the airlines' proposal be disapproved; their reasons are on record in your files and if you will look them over you will see that the Regional Administrators just didn't want to part with a function as important as Air Carrier Inspection.

None of the Regional Administrators had had any air carrier inspection experience; nor had the Director of Safety Regulation, who was Fred Lanier, a former General Inspector; nor had Al Koch, who was also a former General Inspector and who, as Director of Safety Regulations in 1941, had turned down a similar proposal made by a select group of airline inspectors whom Administrator Connolly had dispatched on a four-month special investigation to determine how airline safety and CAA inspection could be improved.

Not until the Director of Safety Regulations and the Regional Administrators made a counter-proposal which they claimed would obtain all the advantages of the airlines' proposal yet still retain all the "advantages inherent to regional operation" did Mr. Wright finally decide to go along with his Regional Administrators.

Mr. Wright, who recognized the importance of high-caliber airline inspection, had previously successfully conducted a personal campaign to obtain higher starting salaries for Air Carrier Inspectors when he found it impossible to hire qualified men at the available salary; there were only 17 Air Carrier Inspectors in the field at that time, and the rate of turnover was as high as 50% per year.

General Inspection, on the other hand, encountered no difficulty in employing inspectors whenever vacancies occurred. There was comparatively little for the General Inspectors to do and it became a rather general opinion that close regulation and supervision over private flying had outlived its usefulness.

The outlook for the favorite branch of the CAA Old Guard—General Inspection—of which most of them were alumni, was dark indeed.

They therefore conspired to "get a piece" of airline inspection and flight test engineering's functions and to reduce the qualifications required for inspectors of those branches to the point where General Inspectors could qualify as either inspectors or supervisors.

They also "leveled" the starting salaries of inspectors of all branches and sabotaged the months of effort Mr. Wright had expended to get a reasonable starting salary by which qualified Air Carrier Inspectors could be attracted into the service.

Having carefully laid their plans, they convinced Mr. Wright that a "reorganization" was necessary. The reasons were couched in lengthy governmentese very similar to that which Mr. Hensley and Mr. Davis labeled "the facts" in their letter of Mar. 21, which purports to explain Reorganization III.

The General Inspection Division was renamed the Airman Division and was given the duties of certificating and checking all airmen, including airline airmen.

This gave the Old Guard an opportunity to tell congressmen and budget committees that these inspectors were necessary to watch over airline safety and to say they had substantially reduced the budget requests for watching over private flying, charter flying, etc.

It also gave the Old Guard the opportunity to tell CAA Classification and Civil Service that, in view of the importance of checking airline airmen, the salaries of these inspectors should be increased.

Presto! A dying empire was revitalized by the simple process of changing a name and adding a duty!

The Flight Test Engineering Division took over air carrier maintenance inspection and was renamed the Aircraft Division.

The Air Carrier Division gave up its former duties of certificating and checking air carrier crewmen and air carrier maintenance and was renamed Flight Operations Division. A Branch was added, manned by former General Inspectors, and named Non-Scheduled Operations.

Of course, the same number of people was "insufficient" to accomplish the same amount of work under this startlingly efficient "reorganization" so it was necessary to recruit a great many more. With more people, it was necessary, naturally, to have additional chiefs. And since the chiefs had greatly increased responsibilities, they were reclassified to higher grades.

After months of preparation, wholesale transfers, careful "screening" of all personnel to get the "best available men in the top positions," etc., the "reorganization" went into effect. It fell flat. The General Inspectors did not have airline transport pilot licenses so it was necessary to send them to Oklahoma City for extensive (and expensive) training before they could assume their new duties.

The Non-Scheduled Inspectors were in the same boat. An Airman Inspector couldn't service John Doe, the operator of two Cubs, because John had now become a "non-scheduled air carrier" instead of the Little City Flying Service. As a non-scheduled

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air carrier John had to have Operations Manuals for his Cubs, a maintenance manual, a chief pilot, a superintendent of maintenance, maintenance and operations bases, etc. He had to make out applications by the gross and could not legally operate until he had a "non-scheduled certificate." His applications had to be reviewed not only by field inspectors but by chiefs in the regions and in Washington.

This carefully planned and magnificently executed "reorganization" created confusion and chaos all over the country. It required a Philadelphia lawyer to determine where the responsibilities and authorities of the individual Divisions and Branches and Sections and Districts commenced, where they overlapped and required "coordination," and where they ended. It was difficult to tell which "Chief" had jurisdiction over which Indian.

Complaints from the public, the industry and the field inspectors were so numerous and vehement that Washington said the whole deal had been misinterpreted by everyone.

Washington issued hundreds of new directives and sent everyone to "indoctrination" schools. The real intent, said Washington, was for every inspector to perform every duty for which he was qualified; the inspector was really supposed to wear several different hats and perform whatever duty the occasion might demand.

In many places, the chiefs and the field inspectors got together, agreed to junk the "reorganization," reapportioned duties and responsibilities as of yore, and, after many hectic months, things quieted down under some semblance of order.

This brought the curtain down on Act I.

Does this refresh the memories of you Old Guardsmen? You duped Mr. Wright. You cheated the industry out of a streamlined and efficient Air Carrier Inspection setup. You tightened your grip on Flight Engineering and Air Carrier Inspection. You saved General Inspection from near oblivion. You added and up-graded a lot of Chiefs and Indians. You placed a few more of your clique in high positions. You demoralized and paralyzed the field inspectors. You squandered hundreds of thousands of dollars of the taxpayers' money. You saddled the small aircraft operators with the largest and most useless package of red tape in aviation history. You caused chaos and confusion to reign supreme, and caused CAA to lose more prestige and respect that it could regain in ten years.

ACT II

Mr. Reutzel became Administrator and was already aware that Aviation Safety was a sorry mess. He toured the country and talked to many CAA field people. He suspected the Old Guard but had no idea of how large it had become.

He ordered changes designed to straighten Aviation Safety out. He made an effort to weed the weaklings out of high positions by personally participating in a personnel screening process prior to Reorganization II, which the Old Guard had reluctantly agreed was necessary because Mr. Reutzel was so obviously aware of some of the facts.

In attempting to agree on a better organization for Aviation Safety, to improve the ridiculous conditions described in Act I, the Old Guard had a falling out and split into two camps.

One camp was for returning to the form of organization in effect before Reorganization I, while the other favored further innovations and patchwork. Mr. Reutzel still did not realize the opposing factions were brothers under the skin and ordered them to work out a compromise.

The opposing groups had separate and joint meetings and eventually agreed to patch up their differences for the purpose of maintaining just one Old Guard instead of two. They feared exposure of their past sins and their present incompetence and for a while they were doubtful of their ability to prevent Mr. Reutzel from wielding the axe on some of their membership. (Later on, they recovered their confidence.)

Essentially, Reorganization II went about half way back to where things stood before Reorganization I. Functions and duties were partially reshuffled to more nearly describe what the inspectors in the field were doing. "Half-way" may be an exaggeration, perhaps "one-third" is more accurate.

The Aircraft Division was allowed to remain independent in the regions but the Airman and Flight Operations Divisions were merged under one supervisor. The Washington organization was different than the field organization and required that field chiefs report to more than one Washington chief.

One of the Old Guard (Al Koch) took over inspection of overseas air carriers and, in setting up his organization, plagiarized the Air Carrier Inspectors' recommendations of 1941 and the airlines' proposal to Mr. Wright of 1945 which Koch had so vigorously turned thumbs down on. He pacified his cronies by naming his organization the "International" or "10th Region," and by promising them he would still find good reasons which would permit them to travel around and about the world at taxpayers' expense as of yore.

Now, another region means another Regional Administrator, complete with a large battery of assistants, coordinators, deputies, etc., so the rest of the gang didn't grumble very loudly, although some of them asked each other, "If this separate air carrier inspection outfit works well, won't Mr. Reutzel be likely to establish a similar organization to inspect the domestic airlines?"

The reply was lost in the noise of heralding the new region—in terms just like those which were used to herald Reorganization I.

Reorganization II, since it went one-third of the way back, was some help but not very much. One region (I) kicked over the traces altogether and the man who was Chief of the "Safety Operations Division" (which was the name of the merged Airman and Flight Operations Divisions) said he could not be bothered with further enactment of the farce and that, if he stayed, the inspectors would be assigned to "General Inspection" and "Air Carrier Inspection" duties just as though there hadn't been any "Reorganizations I & II."

This caused great consternation in the Old Guard camp, but they allowed him to stay on the job and he did precisely as he had said he would. Various members of the Old Guard were told to "get him in line," but none was able to do it.

Some of the other regions began to follow the example of Region I to a lesser degree. Mr. Hensley, of course, was Director of Aviation Safety, and Mr. Davis, who had been Deputy Chief of Safety Operations in Region I, was now Mr. Hensley's deputy.

Mr. Reutzel had moved on to the CAB and Mr. Nyrop had become Administrator. "Reorganization" became the topic of general conversation. As the curtain came down on Act II, a "proposed reorganization of Aviation Safety" plan was sent to the regions for comment. Mr. Nyrop moved on to refill Mr. Reutzel's shoes at CAB and Admiral Horne became the new Administrator. Act II was dull. It was hardly more than a boring repetition of Act I. The Old Guard duped Mr. Reutzel and made a couple of passes at Mr. Nyrop; placed a few more of the chaps in high positions, etc. (Re-read Act I.)

ACT III

This, Messrs. Hensley and Davis, is the act which you labeled "the facts" in your Mar. 21 letter to AVIATION WEEK. To one who did not know what happened in Acts I and II it would sound convincing, provided he could interpret the governmentese.

However, to one who has seen Acts I and II, Act III is an old and tedious story.

You have returned to the identical form of organization in effect prior to 1946, thus your "reorganization" cycle has taken you back to what you and your predecessors were so positive was "inefficient" and "obsolete."

Your publicly stated objectives and predicted benefits, phrased in the same high-sounding governmentese, have been identical but applied to "organizations" completely different. Now you return to where things were when you started. Not even the Division names are much different. "Flight Test Engineering," "General Inspection," and "Air Carrier Inspection" divisions of 1945 become the "Aircraft Engineering," "General Safety," and "Air Carrier Safety" divisions of 1952.

The regional "Superintendent of Safety Regulations" of 1945 becomes the "Chief, Aviation Safety Division" of 1952. The only essential difference is that there are more amateurs in high positions because you have rewritten the supervisor's qualifications substituting "administrative ability" for technical experience and competency.

On three separate occasions during a six-year period you have demonstrated that your real objectives are petty politics and perpetuating yourselves and your Old Guard cronies in power.

You have so frustrated and demoralized most of the competent men in Aviation Safety that they will not accept key positions under your regime. You are now even finding it difficult to recruit Section Chiefs!

And during the six years of confusion and chaos which you deliberately and maliciously created what has happened to safety? You haven't even fooled your own subordinates. Why don't you take a secret poll of what the Aircraft Engineering and Air Carrier people think of you and your reorganizations?

You must realize that your fumbling and bumbling with vital safety matters could constitute gross incompetence, in charitable terms, or criminal negligence, in less charitable terms. Why don't you call it a day, return to fields of endeavor more compatible with your abilities, play your petty politics in spheres of lesser importance, and allow someone with courage, conscience and competence to take the stage for Act IV?

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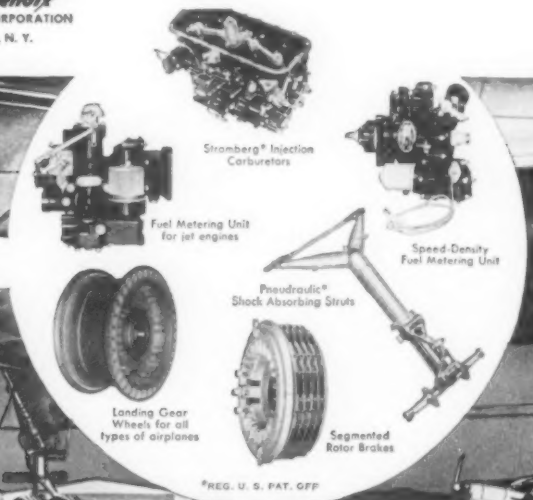
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